



**DISEASES OF THE SKIN**

**THE**

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THE LEADING MONTHLY MEDICAL JOURNAL

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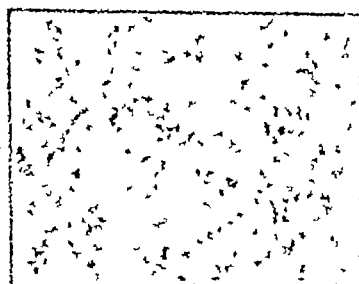
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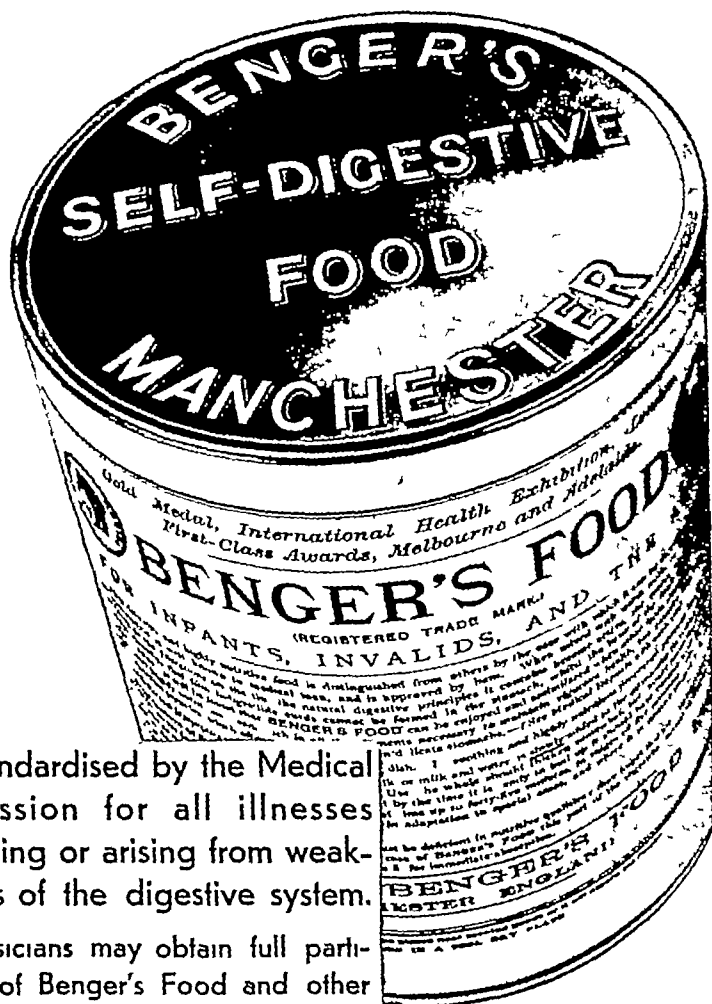
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Current, Deposit & other Accounts (including Profit Balance)	£359,158,995	Liabilities of Customers for Acceptances, Confirmed Credits & Engagements	19,222,279
Balances due to Affiliated Companies	2,793,400	Bank Premises at Head Office & Branches	8,584,861
Acceptances & Confirmed Credits Engagements	9,148,354	Other Properties & work in progress for extension of the business	1,221,452
	10,073,925	Shares in Yorkshire Penny Bank Ltd.	750,000
ASSETS		Capital, Reserve & Undivided Profits of	
Coin, Bank Notes & Balances with Bank of England	38,505,989	Belfast Banking Co. Ltd.	1,543,356
Balances with, & Cheques on other Banks	15,205,876	The Clydesdale Bank Ltd.	2,990,462
Money at Call & Short Notice	16,129,800	North of Scotland Bank Ltd.	2,373,191
Investments at or under Market Value	42,190,262	Midland Bank Executor & Trustee Co. Ltd.	387,052
Bills Discounted	57,132,250		
Advances to Customers & other Accounts	197,837,464		

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THE Annual General Meeting of the Shareholders of Westminster Bank Limited was held on Wednesday, January 27th, at the Head Office, Lothbury, E.C. The Hon Rupert E Beckett (Chairman) presided.

The Chairman, at the outset, referred with regret to the retirement from the Board of Mr Oswald Magniac, after twenty-six years' service, who joined the Board of the London and County Bank in 1905. Also they had lost the eminent services of Mr Walter Runciman, who had been appointed to the Presidency of the Board of Trade.

As to the Bank's Balance Sheet, Current and Deposit Accounts were down on the year by just over £19 millions. The fall in Deposits had not been peculiar to their Bank; the decline over the year of 6½ per cent. comparing with a drop of 8 per cent. for the "Big Five" American Banks, also, had had a similar experience, the fall in total deposits of four of the largest banks over the year being 2½ per cent. This diminution in the Banks' trading funds had obviously affected its capacity to earn profits.

## BANK'S APPROPRIATIONS

The profit for the year, he said, amounted to £1,601,822, a diminution of £220,066 or 12½ per cent. Considering all things, and bearing in mind the decline in Current and Deposit Accounts, these results, he thought, might be deemed satisfactory. In regard to the dividends, he recalled that a year ago he indicated to the Shareholders that, although the usual dividends had been paid for 1930, the Directors would have to take into earnest consideration whether they would be justified in maintaining in the ensuing year the same rate upon the partly paid ¼ Shares. They were paying 18 per cent for the year. Over the past thirteen years, 20 per cent had been distributed consistently on the partly paid Shares. It was with reluctance that the Board decided to depart from the standard that had prevailed so long, but in view of the diminution of profits and the general state of uncertainty, no other course would have been compatible with the usual conservatism of their banking practice.

## GOLD AS AN INSTRUMENT OF COMMERCE

Proceeding, the Chairman reviewed the recent trend of those broad economic and financial tendencies which, he said, had left no country, no institution, no individual, unaffected by their grave development.

These, he said, had superimposed distrust of the pound upon our short term creditors' need for cash at home, causing the pound to be swept from its gold moorings. Gold was a token of exchange; it was the international counter accepted by the nations as a standard through which variations in

the quantity and value of goods and services passing from country to country could be adjusted. Gold should, therefore, be the instrument of commerce, and should not be regarded as a commodity of commerce.

## NOTE OF WARNING

Having discussed the many problems surrounding the international situation, the Chairman went on to utter a note of warning, lest it be thought that the elimination of War Debts and Reparations would create a new heaven upon earth. Our colossal internal debt, our burdensome taxation would remain, whilst certain of our commercial and industrial competitors would have secured relief from their already comparatively light obligations. Sir Walter Layton had calculated that Great Britain's internal debt per head of the population would then amount to £150, France's to £56, Germany's to £8, and even that of the United States, the heaviest sufferer from cancellation, to only £27. Those remarks were not to be construed as an argument against cancellation of War Debts. On the contrary, he believed that therein lay our only hope. A National Government had been returned by an overwhelming majority, the Budget, the Chancellor of the Exchequer assured us, had been definitely balanced not only on paper, but in actual fact. Expenditure was under control, economies were in train, and adequate increased taxes were being successfully collected. Those who were not satisfied that the freeing of the pound from gold would automatically restore the proper balance of payments might be reassured by the prompt action which the Government was taking to check such imports as they considered to be either unnecessary or excessive. We could not afford to assume that all that needed to be done at home had already been done, and that our own recovery merely depended upon the renewal of better international conditions.

Finally, the Chairman observed that in closing his Address to the Shareholders last year he emphasized that the greatest need of that particular time was a co-operative effort on the part of the whole nation.

Were the foundations of a world trade revival about to be laid, he asked, or was the world to be allowed to drift into even worse chaos than existed at present? It was to be hoped that the statesmen of the nations whenever and wherever assembled, would subordinate national prejudices to the greater issue of world progress and would unite to work for the common weal. Thus and thus only would there be born anew that hope and confidence of which the world stood in such desperate need, and the weary peoples of the earth would be enabled to raise their eyes to the dawn of promise and prosperity. (Applause.)

The Report and Accounts were adopted and other formal business transacted.

SCIENTISTS the world over have realised the immense value of infra-red rays as a therapeutic agent in the treatment of the modern physician. Today we offer a genuine infra-red ray generator at a modest figure so that every physician possessing an electrical supply may add these beneficial rays to his practice.

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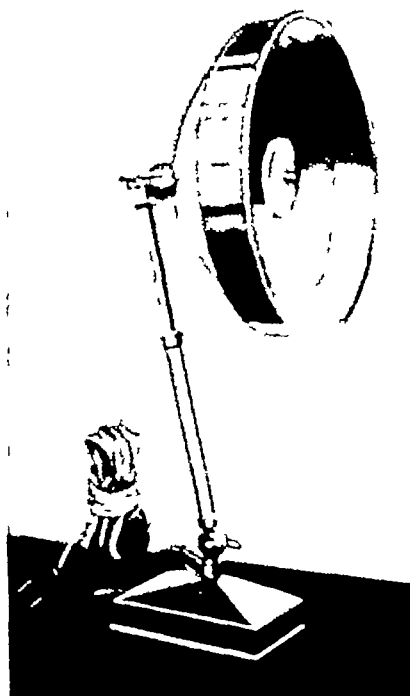
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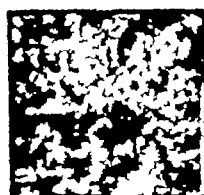
iii. By the introduction of the filter tip the palate loses nothing, but the voice and throat gain immensely, as the irritants are held in check without impairing the flavour or delicate character of the smoke. Thus is the central advantage to be gained from the filter tip.

iv. Cigarettes containing this filter tip will be welcomed both by the medical profession and the public as a valuable means of preventing 'smoker's cough' and other adverse effects on the pharynx, larynx or general health, traceable either directly or indirectly to the irritants and acids in tobacco smoke.



Marked view of cigarette filter (containing 17.5% of the filter tip) BEFORE SMOKING

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From  
"The Practitioner's"  
report

May, 1931

p. 584

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8 - [illegible]  
9 - [illegible]  
10 - [illegible]

*[Handwritten musical notation]*

"HOLDERS" HEALTH APPLIANCE CO., LTD.

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FOR MENTAL DISORDERS,

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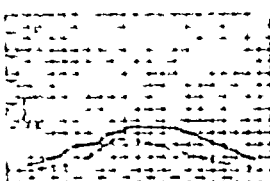
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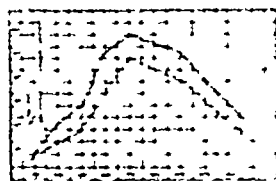
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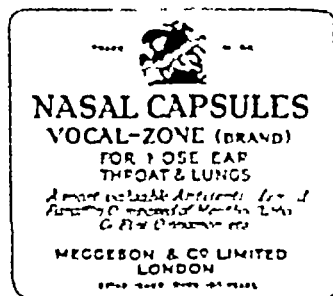
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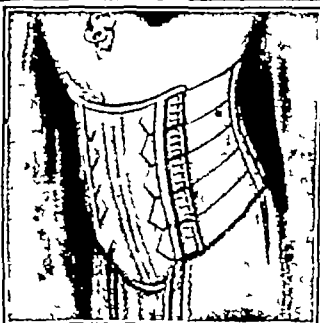
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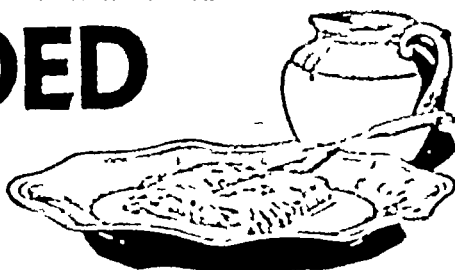
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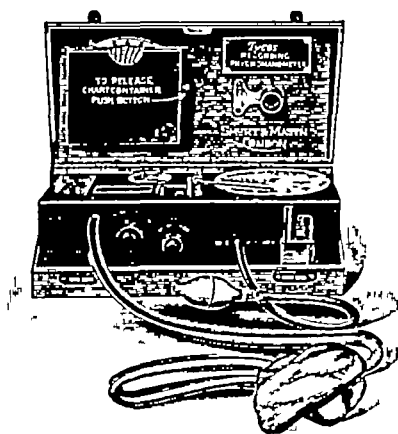
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As SALVITAE contains 59% of Potassium Sodium Citrate and 30% of Sodium Sulphate it is of great value both in maintaining health and in the treatment of disease, through eliminating deleterious nitrogenous products and favourably influencing circulation, glandular secretions, peristalsis and metabolism.

The fruit acids of SALVITAE are converted in the system into potentially basic alkaline carbonates, thus enabling the blood to keep the uric acid compounds in solution, and facilitate their removal.

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# Salvitae

Two sizes

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*Manufactured by American Apothecaries Co., New York.*

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**EVATMINE (B.O.C.)**

*(Prepared in France)*

A scientific combination of adrenalin and pituitary ext.

*Supplied in 1 c.c. ampoules for hypodermic injection*

THIS PREPARATION is also successfully employed in — HAY FEVER, PERSISTENT COUGH, CROUP and other spasmodic affections, URTICARIA, ANGIONEUROTIC OEDEMA, CHILBLAINS, COLLAPSE and SHOCK.

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## A Powerful Fibrolytic Agent

Gives strikingly successful results in many cases of rheumatoid arthritis and allied arthropathies

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It is a chemical combination of Iodine and Thiosinamin with these special features

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**Absence of local reaction on injection.**

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Largely prescribed in  
PSORIASIS, PRURITUS ECZEMA  
SCABIES, and all SKIN DISEASES  
Relieves Pain and Intense Itching  
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Is a most effective cleanser for  
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**UNG. THIOMEL**  
A valuable remedy for the treatment of  
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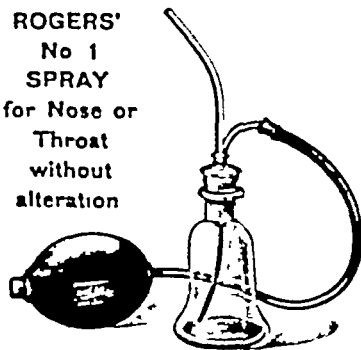
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SPRAY  
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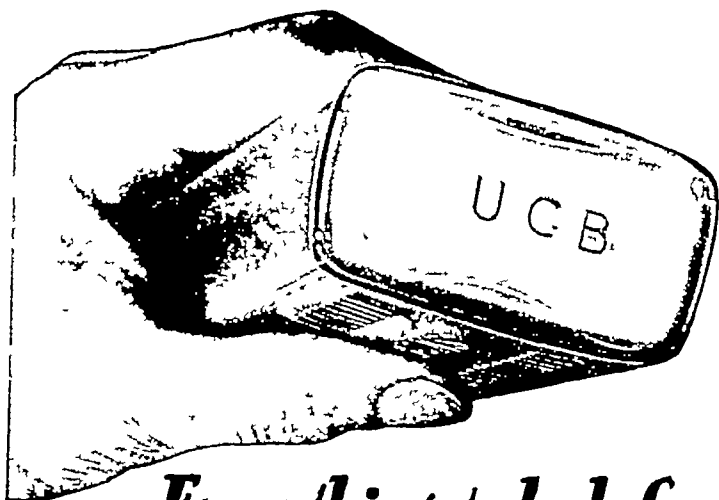
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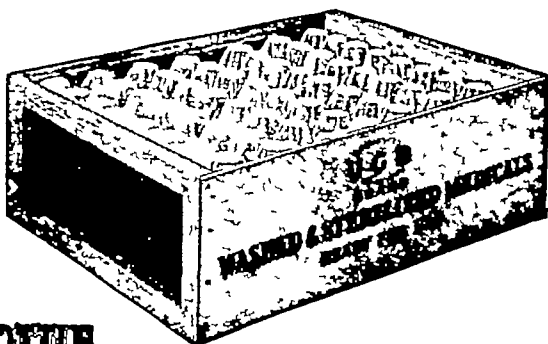
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*Illustration of the Petri-dish showing  
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In Solutions 1, 2 and 4, as shown in the illustration, the bacteria continued to grow, at a temperature of  $37^{\circ}\text{C}.$ , in the incubator, whereas in Solution 3, the NOVUTOX SOLUTION, the bacteria were killed, and produced no growth, as can be plainly seen in the illustration.

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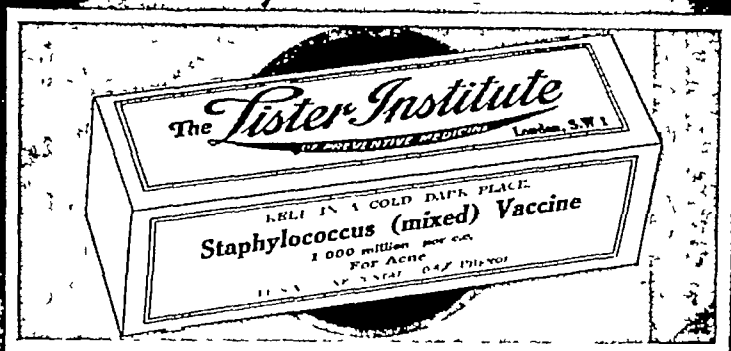
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OF PREVENTIVE MEDICINE

Therapeutic Substances Act, 1925 Manufacturing Licence No 9

## Antitoxins, Vaccines and Serums



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Composition of *Staphylococcus Aureus* and  
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1 c.c. phials, supplied in various strengths.

### Anti-Dysentery Serum (Multivalent)

Shiga (5,000 units) Flexner 1, 2, 3, 4  
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In phials of 3 c.c. equivalent to 18 c.c. natural serum  
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In phials containing 10 and 25 c.c.

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In phials containing 25, 50, 100 and 1,000 million  
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In phials containing 330 and 660 million organisms  
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Samples for clinical trial will be forwarded on request to duly qualified members of the medical profession on application to Bristol-Myers Company, 112, Cheapside, London, E.C. 2

Sal Hepatica possesses all the essential qualities of the perfect purgative. Its action is prompt, painless and thorough. It is non-habit-forming, because it contains sodium phosphate which increases bile secretion—thereby avoiding the habit-forming propensities of other laxatives that call for steadily increasing doses. The exhibition of Sal Hepatica is by far the most pleasant and effective means of eliminating all toxic amino acids from your patient's system and ensuring regular defecation. Sal Hepatica is an efficient eliminant, antacid, cholagogue and diuretic.

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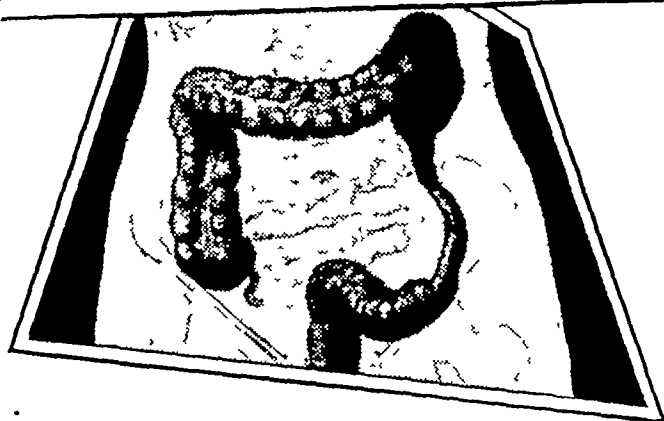
Sal Hepatica contains sodium sulphate, sodium phosphate, sodium chloride and lithia citrate in an effervescent medium.

# Hepatica

the proved, medicinal, saline laxative and cholagogue



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A SPASTIC bowel is frequently found in the patients who have been taking cathartic drugs without medical advice over a long period.

These cases respond readily to treatment with 'Petrolagar' as :

- 1 It has a bland soothing action
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*'Petrolagar' is 65% pure liquid paraffin emulsified with agar-agar, and may be prescribed with confidence as it has no irritant action whatsoever. It is sold under the trade name of 'Petrolagar' Brand Paraffin Emulsion*

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(Prepared in France)

Supplied in boxes of 6 ampoules of 2 c.c. for oral administration

*It is a living yeast in fluid form specially prepared to activate at body temperature*

It is rich in vitamins, especially vitamin B

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Clears up frequently after about 18 doses of Saccharomycin (B.O.C.)

## BOILS and FURUNCULOSIS

Generally disappear after 12 doses or even fewer

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ENTERITIS, especially in infants

of hot climates

Are treated with very satisfactory results by Saccharomycin (B O C.)

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Asthma, Urticaria, Angio-Neurotic  
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*Complete Outfits of Single or Multiple*

## INOCULATION TESTS

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## PEPTONE SOLUTION

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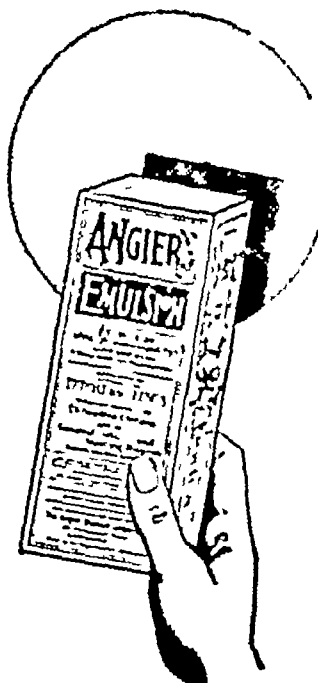
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# The most satisfactory form in which to administer Petroleum



Liquid Paraffin is repugnant to many fastidious patients because of its oily, greasy character. Occasionally it causes nausea and upsets the stomach. Frequently there is leakage which prohibits its continuous use. Even when taken readily and without these drawbacks, its failure to mingle with the food and with the fecal mass, lessens its full efficacy.

Angier's Emulsion is made with a specially purified petroleum of just the right degree of viscosity. It is palatable and freely taken by those who object to the plain oil; it does not nauseate or upset the stomach, it



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"'Luminal' is especially valuable in cutaneous affections in which a large neurotic factor plays a part, such as pruritus ani

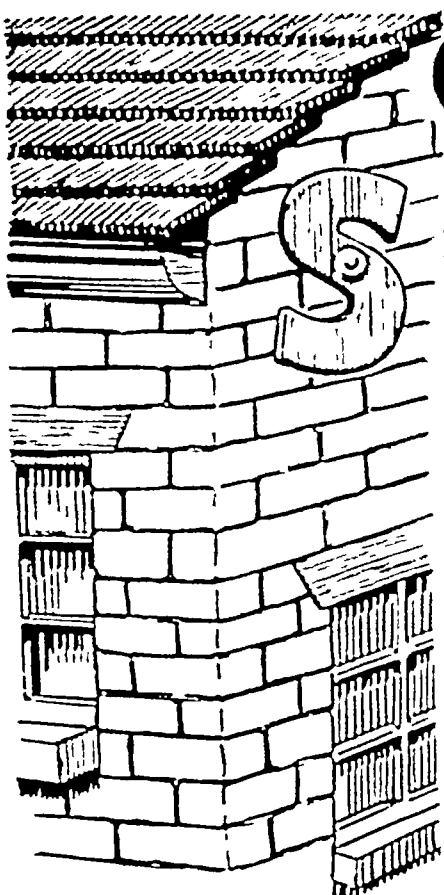
Used in gr.  $\frac{1}{2}$  doses and combined with appropriate local treatment\* it greatly diminishes the pruritus and so helps to break the vicious circle in which scratching keeps up an abnormal and irritating state of the skin "

("The Therapeutic Uses of Luminal" by W Russell Brain, DM Oxf, MRCP Lond—"The Lancet" October 26th, 1929, p 867)



\* We recommend  
'Cycloform' Ointment

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is essential in all cases of weak walls. The CURTIS ABDOMINAL SUPPORT Model No. 1 is scientifically constructed and supports the abdominal wall without cramping or binding the hips, giving the patient freedom of movement.

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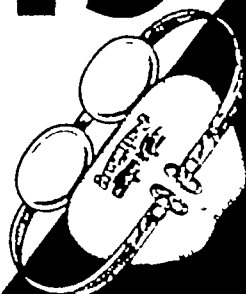
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# Local Anæsthesia in Surgical Practice.

## REDUCTION OF FRACTURE.

### *Typical Case*

E K M, aged twelve years

*Diagnosis* Fracture of the right radius and ulna

*Operation* Reduction of fracture—closed method

*Anæsthesia* Transverse infiltration block 40 cc of 1 per cent Novocain-adrenalin solution being used

*Operation* A transverse block was immediately made at a point 5 cm above the line of fracture. The fractures were reduced—a moulded plaster splint was applied and the boy allowed to return home with his mother.

*Note* This case is mentioned to illustrate certain points. The child's mother was a widow without funds. The child came to the surgery during usual hours on a busy afternoon. The necessity for preparing him for General Anæsthesia as well as the necessity for employing an anæsthetist or sending the child to the hospital, the amount of time required in order to carry out the necessary treatment were factors which entered into the handling of the case. Under the plan mentioned above, an assistant anæsthetized the arm, the surgeon reduced the fracture, and the assistant then applied the necessary dressing. The total expenditure of time by the surgeon was less than five minutes. Furthermore, the child left the surgery travelling on his own power. From an economic standpoint the use of Local Anæsthesia in such a case presents many advantages—*Extract from "Practical Local Anæsthesia"* (Farr)

(Full technique of this, and one hundred other operations under Local Anæsthesia, will be found in the above work, published by Henry Kimpton, 253 High Holborn, London W C 1.)

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use of surgeons at all the chief hospitals. Specify  
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NOVOCAIN DOES NOT CONTAIN COCAINE AND IS NOT SUBJECT  
TO THE RESTRICTIONS OF THE DANGEROUS DRUGS ACT

*Literature on request*

**THE SAFEST LOCAL ANÆSTHETIC.**

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*The Original Preparation*  
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*In the treatment of Addison's Disease*

Prepared according to a method which is claimed to give maximum potency. It is issued in the form of a sterile non-toxic solution, 1 cc. being equivalent to 30 grammes of Cortex. It is completely free from Adrenalin, poisonous metals or other disturbing substances, and it is adjusted to a pH which renders it eminently suitable for intravenous or subcutaneous injection 5 c cs., and in certain cases possibly more, administered twice daily, for three days or longer, is claimed to give satisfactory results.

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It is made from selected ox pancreas which is subject to the strictest examination before use

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Each batch of Insulin (Boots) is tested for potency against the International Standard Insulin and also for sterility—these tests being carried out both before and after filling into ampoules. A sample of each batch, together with reports on the potency and bacteriological tests made, are submitted to the British Medical Research Council whose certificate of correct strength and sterility is obtained before the batch is issued

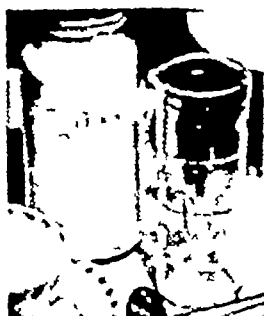
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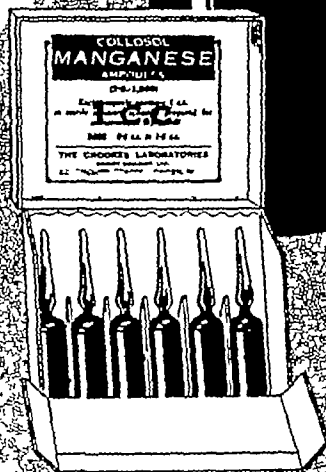
It is a partially pre-digested food made from pure full-cream milk and the nutritive extracts of malted barley and wheat. It is particularly useful in febrile cases where gastric digestion fails. It is well tolerated, having a low fat content, and containing the mixed carbohydrates lactose, maltose, and dextrin. HORLICK'S enables the patient to have small and frequent freshly made feeds.

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Indicated in boils,  
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deep-seated cocco-genic  
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Special attention is drawn  
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'METATONE' contains an active extract of vitamin "B" in solution with nucleinic acid and the glycerophosphates of sodium, potassium, calcium, manganese, and strychnine. These are combined in a palatable, clear, wine-red vehicle.

'Metatone' may confidently be prescribed in cases of anæmia, malnutrition, convalescence from operations and debilitating diseases, and all run-down conditions generally. One to two teaspoonfuls after meals is the dose; as a stomachic tonic it is better given before meals.

*Supplied in bottles of 8, 16 and 80 fl oz.*

*A specimen and further particulars will be supplied on request*

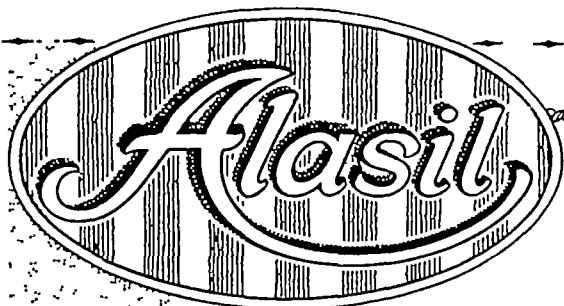


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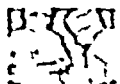
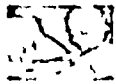
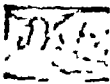
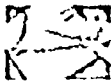


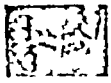
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Acetyl-salicylic acid possesses a notable disadvantage. Physicians have proved that it cannot be tolerated by patients suffering with a delicate stomach. Consequently, the value of this medicament in the wide field in which it is indicated is very seriously reduced.

"Alasil" completely overcomes this objection. By combining calcium acetyl-salicylate with "Alocol," unfavourable secondary action upon the stomach is prevented. This beneficial influence is undoubtedly due to the presence of "Alocol" (Colloidal Hydroxide of Aluminium), which preparation has brilliantly stood the test of practice in the treatment of hyperacidity and other ill-conditions of the gastric tract.

"Alasil" is therefore a triumph over acetyl-salicylic acid. It enables higher doses to be administered and maintains the patient's system under its influence for a greater length of time. Analgesic, Antipyretic and Sedative, "Alasil" is indicated in all cases where acetyl-salicylic acid has been used heretofore.

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In preparation for the operation  one  
 tablespoonful of Agarol on retiring   
 in place of the usual castor oil, will in-  
 sure against gastric upset.  Again, a  
 few days later  when the patient be-  
 gins to take nourishment  Agarol  
 in half doses  is the logical elimi-  
 nant because it stimulates peristalsis  
 gently without griping or pain

Agarol Brand Compound is palatable without artificial flavouring and easy to take. The usual dose in chronic constipation is a tablespoonful, reduced as improvement takes place.

*AGAROL Brand Compound is the original mineral oil and agar-agar emulsion with pherolphthalein. It softens the intestinal contents and gently stimulates peristalsis.*

A supply gladly sent for trial.

## AGAROL *for Constipation*

BRAND COMPOUND

FRANCIS NEWBERRY & SONS, LTD., 31-33, Banner Street, London, E.C.1.

*Prepared by WILLIAM R. WARNER & CO., INC., Manufacturing Pharmacists since 1856.*



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Judged by the numerous reports received from physicians and also from grateful patients the use of "Ovaltine" for ensuring sound refreshing sleep deserves the widest recommendation

It has been remarked that a more helpful prescription could not be wished for because

- 1 Taken last thing at night before retiring it exercises a pronounced sedative effect and one that is natural in every sense
- 2 It has a pleasantly soothing action on the stomach and nervous system and does not cause the slightest digestive unrest, or occasion constipation
- 3 It promotes a sufficiency of healthful sleep without resource to hypnotic drugs

"Ovaltine" is a delicious concentrated extraction of malt, milk and eggs, in the form of golden granules which dissolve instantly in milk

*A liberal supply for clinical trial sent free on request*

A WANDER, LTD, 184 Queen's Gate, S W 7  
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*A Sphinx  
from Tants*

# Bowel Inertia

THE Physician is familiar with the patient who complains of headache, loss of appetite, depression, who is not suffering pain but is nevertheless conscious that his or her general health is far below the standard it should be.

Diagnosis often reveals auto-intoxication—the result of habitual constipation. The use of a suitable stimulant is indicated.

“Cristolax” proves exceptionally successful in such cases. It is composed of 50% of the purest medicinal paraffin in combination with 50% “Wander” Dry Malt Extract. The high diastatic

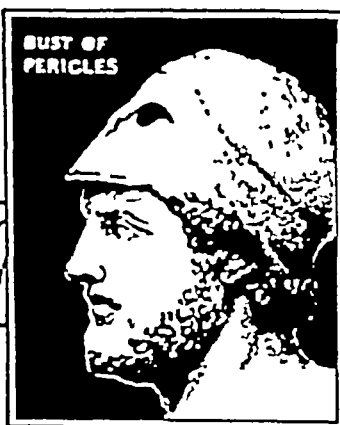
quality of the pure malt extract gives material assistance to the digestive process which is often impaired in this condition, whilst the oil content lubricates the intestinal tract, keeps the faeces soft, and ensures their complete expulsion.

A delicious preparation in a clean, convenient dry form for infants, children, and adults.

**‘CRISTOLAX’**  
BRAND  
MALT EXTRACT WITH PARAFFIN  
*Lubricant-Laxative-Nutrient-Digestive*

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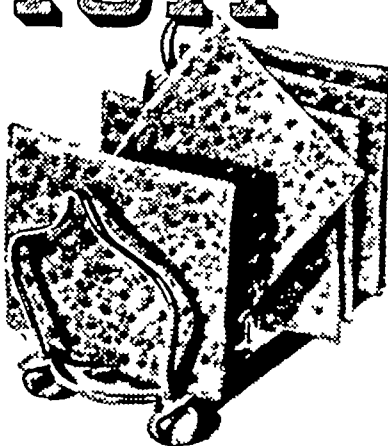
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## The Significance and Pathogenesis of Certain Dermatoses

By H. W. BARBER, M.A., M.B., F.R.C.P.

*Physician in charge of the Dermatological Department, Guy's Hospital*

HOW often does the dermatologist hear both general practitioners and consulting physicians protest that they "know nothing about skins"! They do not, however, confess to complete ignorance of the stomach, the liver, or the kidneys, although accurate diagnoses of the disorders of such hidden organs are largely dependent upon laboratory tests. The skin, its appendages, and the accessible mucous membranes, on the other hand, lend themselves to direct observation, and provide the mirror in which the eye that has been taught to see can often detect with certainty the nature and cause of a disease which is primarily independent of them. To give but one example, some years ago I was asked by one of my colleagues to see a young girl, who had a most severe pustular rosacea associated with cirrhosis of the liver. So characteristic were the clinical appearances of this unusual rosacea, that I was able correctly to diagnose hepatic cirrhosis in two other patients from the facial condition for which they consulted me.

Admittedly the number and variety of eruptions and functional disorders that may involve the skin are so great that only the specialist can be expected to recognize the rarities, but any student, if he is properly



cutaneous manifestations with those involving other organs, and the striking influence of diet upon the activity or remission of the various symptoms. Under a strict vegetarian régime with regular exercise these remained more or less in abeyance: on the other hand, a return to his former dietary, which included a large proportion of meat, fish, and eggs, together with alcoholic drinks, invariably caused a recurrence of one or more of his allergic reactions.

This intimate record of a life of suffering affords a fitting introduction to the study of those conditions that Danysz terms "non-contagious chronic diseases," in the etiology of which heredity, individual predisposition, environment, severe acute or chronic infections, and habits of life play so important a part. In the great majority of persons who from infancy are subject to the successive or alternating manifestations of allergy, such as infantile eczema, asthma, urticaria, paroxysmal rhinitis and prurigo, careful questioning will reveal the importance of the hereditary factor. In those in whom there is little or no evidence of any inherited predisposition, an acquired hypersensitiveness may supervene on some grave infective disease or toxæmia e.g. tuberculosis, syphilis, typhoid fever, malaria, an acute streptococcal infection, and food or drug poisoning, it may also result from an unhealthy environment and faulty dietary both in childhood and adult life. Two cases of acquired hypersensitiveness to light come to my mind as illustrations —

One, a healthy man with no previous history of allergic symptoms, had a severe attack of food-poisoning, with violent sickness and diarrhoea lasting three days, on board ship. On the fourth day he left his cabin, and went into strong sunlight on deck. From that time he was light-sensitive. The other, a plethoric man of middle-age, fond of good living, went to Paris with some boon companions, and ate and drank to great excess. He returned to England and played golf on a sunny day the following week-end. He developed an acute eczematous dermatitis of exposed parts, which recurred whenever he went out of doors. When I saw him, his liver was palpable three fingers' breadth below the costal margin, and his urine contained a large quantity of urobilin with a heavy

Purpura may also rarely occur. The buccal and pharyngeal mucous membranes sometimes present a red flush with a varying degree of œdema, which may extend to the glottis.

(2) *Articulations*—Arthralgia is very common. Effusion into the joints, or more usually a periarticular swelling, involving chiefly the metacarpophalangeal and interphalangeal articulations, may be seen with or without a cutaneous eruption. The clinical picture may strikingly resemble acute rheumatoid arthritis.

(3) *Lymphatic glands*.—A localized or generalized adenitis may accompany the serum rash, and in some cases the glandular swelling is the predominant symptom.

(4) *Nervous system*—The various symptoms indicative of involvement of the nervous system are of great interest. (a) *Psychical* Depression, excitement, delirium, and convulsions, or prolonged hypnosis, particularly in children. (b) *Meningeal* These occur only after intrathecal injections, and need not be considered. (c) *Neuritic* These are rare, but have been studied in detail by several observers. They consist of paralyses, usually of the Duchenne-Erb type, with muscular wasting. Cases with purely sensory symptoms also occur.

(5) *Urinary and other systems*.—Lastly, oliguria and albuminuria are the rule during the stage of active symptoms, hæmaturia is rare. Vomiting and diarrhœa, enlargement of the liver, and pulmonary engorgement may all occur. Thus in serum sickness there is a veritable acute eruptive fever, with an incubation period varying from four to thirty days, the average being eight to eleven, a period of active symptoms with pyrexia, and a period of convalescence. The polymorphic nature of its manifestations is dependent upon the particular tissues that are sensitized, and this in turn, as in the experiments upon animals already referred to, is a matter of individual idiosyncrasy. The importance of serum sickness lies in the fact that, by the injection of a known antigen, we may produce

diverse symptoms, which recall many of the non-specific diseases that occur both in human beings and animals. For the purpose of this article its significance as regards the cutaneous symptoms will alone be considered, but what will be said is, with certain reservations, equally applicable to other non-specific conditions, such as paroxysmal rhinorrhœa, asthma, migraine, rheumatoid arthritis, certain gastro-intestinal disturbances, periodical albuminuria, gout, and probably epilepsy, nephritis, and arteriosclerosis.

#### THE NON-SPECIFIC ERUPTIONS

As an example of a *specific* eruption we may take that of pityriasis rosea. Although the causal organism has not yet been isolated, no one can doubt that this disease is of infective origin, the responsible virus being inoculated at one or more sites on the skin, where it produces the so-called "herald" patches, and subsequently reaches the blood stream. The characteristic generalized eruption is no doubt due to the circulating virus coming in contact with the skin, which by this time has become sensitized by the localized growth of the virus in the herald patches (cp. secondary syphilide, vaccinal exanthem). Slight adenitis may accompany the eruption. The infection lasts for some five to eight weeks, and then dies out: recurrences are very rare. Pityriasis rosea is thus a specific infective disease in which spontaneous recovery occurs. The *médallions* of the secondary eruption are pathognomonic and peculiar to the infection.

When, however, we come to consider the non-specific eruptions—urticaria, angio-neurotic œdema, eczema, erythema multiforme, erythema marginatum, erythema scarlatiniforme, erythema nodosum, the prurigos, and, in my opinion, lupus erythematosus, psoriasis and dermatitis herpetiformis—although the elementary lesions are characteristic, and might therefore suggest, as in pityriasis rosea a specific causation, a study of



a dozen cases of any one of them makes this view unlikely. No one now doubts that urticaria, angio-neurotic œdema, and eczema are merely reactions that may be provoked by very numerous primary causes in a sensitized person, the first being a dermal response, the second subcutaneous, and the third epidermal. But with regard to some of the erythemata and lupus erythematosus, there are many who still presume a hypothetical specific causation. Erythema multiforme of the classical type may appear repeatedly in certain persons as an accompaniment of streptococcal tonsillitis, and may be associated with erythema nodosum, there being sensitization of both dermal and subcutaneous tissues. It may occur, as has been said, in serum sickness, although the majority of serum rashes are constituted by a mixture of urticarial and circinate erythematous lesions. It may constantly follow the ingestion of certain drugs or articles of food in some persons, and one of the most severe attacks that I have ever seen, in which the eruption was of the classical type, was proved to be due to medinal. It may result from general sensitization to a trichophyton fungus, and, in some cases, apparently to the tubercle bacillus.

It might be argued a priori that an eruption, which can be provoked by so many and diverse primary antigens, cannot be etiologically specific, but herpes simplex, which may occur in several infective diseases and may follow trauma or the administration of certain drugs, is nevertheless always due to the same virus, whatever the exciting cause may be. It is possible that erythema multiforme, which, by the way, is not infrequently preceded or accompanied by herpes simplex, may in its classical form be due to a specific virus, but the results of experimental investigations and of treatment based upon them do not support this view, and I think that in the present state of our knowledge we are justified in regarding it and the other

clinical varieties of the erythemata, as well as lupus erythematosus, dermatitis herpetiformis, and psoriasis, as non-specific eruptions, comparable to such conditions as asthma, paroxysmal rhinorrhea, migraine and rheumatoid arthritis.

#### PATHOGENESIS OF THE NON-SPECIFIC DISEASES

How are we to explain the pathogenesis of these non-specific reactions of multiple causation? Why is it that a streptococcal or other infection, an article of food, a drug, or a foreign serum can all produce eruptions as distinctive as urticaria or erythema multiforme? The animal experiments cited, and the study of serum sickness have taught us that one and the same antigen can produce different symptoms in different individuals, and it is thus clear that in the pathogenesis of non-specific morbid conditions the nature of the antigen is of no account, the individual affected is all-important. An interesting confirmation of this was afforded by two sisters under my care, who were homologous twins. They were both subject to recurrent outbreaks of erythema multiforme, which as a rule followed mild attacks of tonsillitis, and often their attacks coincided. In this instance two individuals of identical "make-up" apparently reacted to a streptococcal infection in the same way.

It would seem clear, therefore, that the essential factor determining the nature of a given non-specific reaction is not the primary antigen which provokes it, but the effect of that antigen on the individual's tissues, together with the site at which the reaction occurs. In other words, the sensitized person produces his own particular substance—a secondary antigen—which is the immediate cause of his symptom or symptoms, in response either to one or several primary antigens. This explains why in the majority of patients, suffering from chronic urticaria or eczema of internal origin, it is impossible to discover any specific primary antigen,

e.g. a food substance, responsible for their eruption. Occasionally one encounters persons who develop, say, urticaria only after the ingestion of a given article of food or drug, but this is the exception. In the great majority the attacks occur under the influence of multiple causes—the ingestion of a variety of foods or drugs, emotion, fatigue, exposure to heat, cold or light—which provoke the production of the *autogenous* antigen to which their skin is sensitized.

This conception is of fundamental importance, since it provides the explanation of the pathogenesis of the non-specific diseases under consideration. It explains why disputes occur as to the etiology of those of them in which a certain factor seems to be all-important in some cases, another factor equally so in others. As examples, we may take erythema multiforme, erythema nodosum, and lupus erythematosus, in the causation of all of which conditions the rival claims of a streptococcus longus and the tubercle bacillus have been argued in recent years. The explanation offered is that these eruptions are “type” reactions or, as Darier terms them, *syndromes*, which may be evoked in one group of cases by the action of a streptococcal infection on the tissues, in another by that of the tubercle bacillus.

Our conception of the autogenous antigen explains also why so many etiological factors have been claimed to be causative in such conditions as arterio-sclerosis, chronic nephritis, gout, migraine, Graves’s disease, and rheumatoid arthritis. In nearly all these and similar morbid states the hereditary and familial factor is beyond dispute; syphilis, focal infection, abuse of alcohol, diet, worry, shock, cold, and so on—these are but accessory factors, important in some cases, absent in others, which may stimulate in various ways the production of the essential autogenous antigen.

I cannot here present all the evidence in favour of the existence of this autogenous or secondary antigen. It might be deduced theoretically from a consideration

of certain drug eruptions, and from the fact that in many cases of chronic allergic diseases it is impossible to detect any responsible primary antigen.

I propose merely to indicate certain observations that suggest this view —(1) That a person may become sensitized to some product arising from his own damaged tissue is now accepted by most English dermatologists. Whitfield<sup>5</sup> described cases illustrating this auto-sensitization, for example after severe bruising —

One was a lady, who developed a hematoma without breach of surface on the skin after a blow from a cricket ball. Ten days later a generalized erythematous-urticarial eruption, resembling that of serum sickness, appeared. Another case was a lady who fell downstairs, producing a severe bruise on her left wrist. After the same incubation period—namely, ten days, which corresponds to that usually observed in serum sickness, a similar eruption occurred.

I have seen comparable cases, and the phenomenon is not very uncommon after operations involving extravasation of blood such as amputation of the breast. It should be noted that in these cases the eruption is of the erythematous-urticarial type, and that there is a definite incubation period between the trauma and the appearance of the eruption.

More recently Whitfield<sup>6</sup> in a very significant communication draws attention to this phenomenon of auto-sensitization in eczema. He cites the case of an elderly man, who had an acute vesicular eczema of both legs and a mild attack of gout. If the serum from the eczematous vesicles was allowed to flow over an area of normal skin, there appeared, first, "a red streak, secondly, after a few minutes, a well-marked urticarial wheal, and, lastly, a row of vesicles, at first minute and clinically indistinguishable from the primitive vesicles of eczema, but subsequently coalescing to form a linear bulla." On Whitfield's own skin, however, the serum produced no reaction, thus proving that the patient was sensitive to the serum containing his own tissue-products, but that it was innocuous to another person.

are others, in whom no such inherited or acquired tendency to multiple sensitization is apparent, but who develop, sooner or later, some chronic morbid condition, such as rheumatoid arthritis, eczema, psoriasis, or migraine, without any primary cause being necessarily discoverable.

We have seen how in animals similar conditions may be produced experimentally by the *parenteral* injection of foreign proteins, which act as primary antigens, and how in human beings similarly the introduction of a foreign protein or a drug parenterally by injection, may lead to various symptoms of sensitization. In the case of animal emanations, plants, pollens, chemical irritants, drugs, and bacterial infections, the route of access of potential primary antigenic substances may also be parenteral, *via* the mucous membrane of the nose and throat, the bronchial tubes, and the skin. But probably in the majority of cases the route is *via* the alimentary canal.

In normal persons in perfect health the absorption of potentially antigenic *protein* substances from the alimentary tract into the general circulation probably does not occur, for even if they pass the intestinal barrier, they are fixed and altered by the hepatic cells. If, however, the digestion of proteins is incomplete or delayed, owing, for example, to hypochlorhydria or pancreatic insufficiency, if the intestinal mucosa be abnormally permeable, and if the proteopexic function of the liver fails, the absorption of protein substances, capable of causing sensitization of the various tissues, can occur. We have also to consider the absorption of bacterial antigens from the gut, and the direct toxic action of these, or of the products of bacterial decomposition of undigested protein on the liver cells.

As emphasized elsewhere,<sup>9</sup> I believe that functional insufficiency of the hepatic cells is the most important factor in predisposing to sensitization towards antigens absorbed from the gut, and in some cases to those of

parenteral origin. I believe, further, that the secondary autogenous antigen to which sensitization may occur, with the production of the various symptoms under consideration, is probably the result of damage to the hepatic cells by diverse primary antigens, when such are absorbed from the gut, and by toxic substances, such as arsenical and other metallic compounds, when introduced parenterally by injection. This secondary autogenous antigen would thus correspond to the secondary antigen, or anaphylotoxin, derived from the liver, which Mannwaring considers to be the direct cause of anaphylactic symptoms in sensitized dogs. The excretion of this secondary antigen in the urine in conditions of sensitization, as Oriel's work would seem to prove, is not only of great scientific interest, but is also of importance from the therapeutic standpoint. Desensitization of an allergic subject by injection of presumed primary antigens is often impracticable or unsuccessful, whereas the isolation of a person's own secondary antigen and its employment as a specific desensitizer offer a resource which our experience has already shown to be invaluable.

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# Pruritus

By SIR ERNEST GRAHAM-LITTLE, M D , F R C P , M P  
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THERE is much ambiguity in the use of this term. It is often regarded as being synonymous with the sensation of itching, which is the accompaniment of a large number of skin diseases. In the following article I propose to restrict the term to the cases in which the subjective sensation of itching is the sole, or at any rate the first, symptom of disorder, that is to say, itching not preceded by lesions of the skin. This restriction is a matter of clinical convenience, and it is obvious that individual cases may pass from this category to various classes of skin diseases as later symptoms develop.

Cases of pruritus used in this sense may be roughly divided into two classes, those attributable to internal and those attributable to external causes

## INTERNAL CAUSES

Inasmuch as by the definition offered we have to deal primarily with a subjective sensation, the make-up of the individual is of essential importance in determining the measure of the discomfort suffered. Nervous, highly-strung, and tired persons are more likely to have excessive reaction to the symptom than the stolid type, and the neurotic group is one of the largest of the sub-divisions of internal causation. Women suffer more frequently than men, and certain clinical classes may be distinguished

(1) *Hysterical pruritus* — This is found in quite young girls and is marked by frenzied scratching, resulting in mutilating excoriations in which portions of the surface are literally "dug out" by the nails. The disease may occur, but much less commonly, in older

women about the menopause. There are usually other symptoms of hysteria, notably anæsthesia of the soft palate and of the cornea. Scratching aggravates the itching, and means of controlling the hands are essential. It may be advisable to keep the patient in bed for a time under careful observation until the habit is broken and the patient is convinced that she is needlessly hurting herself.

(2) *Necrodermite* — This type occurs usually in middle-aged women, certain parts of the body being particularly affected, such as the nape of the neck, the labia, perineum and thighs. Itching is often the first and occasionally the only symptom, but circumscribed areas of the skin in these regions may become altered by the prolonged scratching, discoloration and induration being the principal changes brought about.

The application of X-rays to these patches will usually relieve the itching and the induration, but the inadvisability of giving repeated doses of X-rays has been burned into our generation by the deplorable frequency of epithelioma in patches so treated, and my own practice is to avoid application of X-rays for this condition until other methods have failed. For long-standing cases (which are just the type for which X-rays are used) I have found great benefit from the following method of treatment. The part affected is swabbed every five days with the following lotion, which is allowed to dry after painting. —

R	Phenol	-	-	-	-	-	-	5j
	Glycerin	-	-	-	-	-	-	5j
	Liq carbonis deterg	-	-	-	-	-	-	5j
	Aq ad	-	-	-	-	-	-	5ij
Ft lot								

In the intervals between its application a calamine lotion may be used several times a day.

(3) A rare but well-defined group of cases may be mentioned, in which the pruritus is really the disordered memory of a past affection, a mental rather than a physical state, found in some persons who may have



contracted a parasitic disease, such as scabies, and in whom the horror is so great that the itching may remain long after the parasitic cause has been eliminated. Success may sometimes be attained by suggestion, and it may be useful, for example, to apply an ointment and to give instructions for disinfection of the clothes—measures which will frequently persuade the patient that her disease, even if it had been imaginary, has been eradicated. Cases of this kind really suffer from the *idée fixe* form of insanity and often drift into asylums.

(4) There is probably a definite class of senile pruritus, usually ascribed to changes produced by old age in the skin, especially its increased dryness, but the very frequent occurrence of pediculosis in old and neglected people should be borne in mind and this cause carefully excluded before ascribing the symptoms to senility.

(5) An obscure class of cases may be mentioned of persons who suffer from what may be called an "excitable" skin, in which moderate friction or pressure will produce exaggerated lesions. This symptom, known as "dermo-graphism," is usually accompanied by itching, which may be intolerable in degree. A course of calcium lactate and parathyroid sometimes gives relief. In exacerbations severe enough to cause loss of sleep hypodermic injections of adrenalin (10 to 15 minims of 1 in 1,000 solution) is the best means of procuring at least temporary alleviation.

(6) *Toxic pruritus*—Pruritus is a prominent symptom of various general diseases, e.g. diabetes, gout, hepatic affections, Graves' disease, the complex known as asthma-prurigo, gastro-intestinal fermentation, visceral carcinoma, malaria and nephritis. Of recent years increasing attention has been directed to the pruritus which often accompanies focal sepsis. The state of pregnancy may be associated, especially in its later phases, with a general pruritus.

Under this same heading ought perhaps to be included the pruritus following upon the ingestion of certain foods and drugs. Much attention has been given recently to the large group of cases which seem to be due to special idiosyncrasies or sensitizations, especially in the asthma-prurigo class, in which inheritance seems to play a considerable part.

General pruritus may be the first symptom of a number of diseases, the nature of which is only demonstrated when characteristic eruptions or other manifestations occur, such as dermatitis herpetiformis; lichen planus; the serious affection known as lymphogranulomatosis the diagnosis of which is usually possible only when lymphadenoma develops; mycosis fungoides, in which also the diagnosis can seldom be made until the characteristic lesions of the skin appear. The treatment of this preliminary pruritus can only be symptomatic, until further characters develop, when the measures appropriate to the particular disease thus demonstrated to be present must of course be followed.

#### EXTERNAL CAUSES

In this group the symptom of itching is most commonly the result of a parasitic disease, the presence of the parasite being overlooked. Pediculosis, scabies and ringworm are the three chief categories of a missed parasitic infection. The position of the itching will often provide the diagnosis. The itching of *pediculosis* is usually most prominent about the shoulders and back; the itching of *scabies* is more general and is always decidedly worse at night, the activities of the parasite being nocturnal. Of late years the part played by *ringworm* infections in producing intense itching has become very much more widely realized. Recent observations demonstrate that a ringworm restricted to quite a small area, such as the toes, may produce, by toxic absorption, a general skin eruption, simulating

salts in a pint of warm water, and during the whole of the day, but particularly during the earlier hours, as much liquid as can be managed should be taken. Any liquid with no food value is permissible, such as tea without milk, orange juice, etc., or plain cold water. During the whole of the day no food at all should be taken but the following morning the ordinary diet may be resumed and adhered to until the day of the next treatment, and no alteration in the ordinary diet need be made at all. Where Plombières douches are available these are a valuable adjuvant.

The commonest sites of focal sepsis are probably the teeth and the tonsils, which should consequently be inspected in every case of unexplained pruritus and faulty conditions dealt with *secundum artem*.

Where sensitization to food stuffs is suspected there are now upon the market means of testing groups of substances likely to produce such sensitization, and where a positive result is obtained valuable help may be afforded in identifying the noxious agent and removing it from the dietary.

It will be obvious from the preceding remarks that adequate treatment for pruritus calls chiefly for general measures rather than local. When, however, the causes of the symptom cannot be ascertained, and that unhappily is frequently the case, symptomatic treatment is required.

The number of local remedies in use for checking pruritus is in itself an indication of the difficulty of controlling that symptom when the cause is not ascertained. The most usually successful agents may be summarized.—(1) The application for a few minutes of compresses so hot that they can only just be borne, followed by dusting with an inert powder, is a very useful measure. (2) Certain chemical substances appear to alleviate itching, temporarily at any rate. The most valuable of these is carbolic acid applied either in the form of a lotion or an ointment in strengths of 1 to 2 per

cent. Dilute hydrocyanic acid is also much used, either as a lotion or an ointment. Camphor, 1 to 3 per cent, has a moderately antipruritic effect. Menthol is anæsthetic as well as antipruritic, and where pruritus is accompanied, as it not infrequently is, by actual smarting or pain, menthol is indicated in strengths of 1 to 10 per cent. I have had some satisfaction from the use of Bayer's cycloform ointment, 10 per cent. The addition of ichthyol (1-3 per cent) to lotions or ointments increases their antipruritic effect. Weak preparations of tar are among the simplest and best applications. A favourite prescription of mine is:

R	Lot acid carbol (1 in 80)	-	3j
	Liq carbons deterg	-	℥ ss
	(1 to 6 per cent)		
			℥ i lot

The addition of cocaine is often advised, but its expense and the dangers of improper use seriously restrict its prescription. (3) Finally, one may recommend the resort to spas, where the environment more particularly helps the patient, who is usually obliged to undergo dietetic restrictions to follow regular hours for eating and sleeping, and is deprived of occasions of excitement or strain which so materially aggravate the symptom of itching. The advantage of spa treatment is to be explained, in my opinion, more upon these general lines than upon baths or other local treatment which is as a rule of quite secondary importance.

# X-ray Treatment of Skin Diseases

By A M H GRAY, CBE, MD, FRCP, FRCS

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WITHIN a year or so of the discovery of X-rays by Roentgen in 1895, this powerful agent had been used in the treatment of certain forms of skin disease. In the earlier years attention was chiefly focussed on the action of the rays in superficial malignant disease but later other types of dermatosis were found to respond favourably to treatment. In the years which have elapsed since that date, not only has the apparatus for producing the X-rays vastly improved, but the experience of a generation of dermatologists has placed X-ray therapy on a firm basis.

*General considerations.*—It is not proposed in this short article to discuss either the physical or technical side of X-ray therapy, except to say that it is now possible by means of the hot cathode tube, first devised by Coolidge in 1914, to produce rays of uniform quality, so that risks entailed by the use of the older forms of apparatus have been largely eliminated.

*Dosage.*—In dermatology, as in no other branch of medicine, is extreme accuracy in X-ray dosage necessary. It was found out quite early that X-rays had the power, in certain doses, of causing epilation. It was also found, if the dose was given within certain narrow limits, that the hair grew again after epilation, but if that dose was exceeded the hair did not regrow. Sabouraud and Noiré in 1904 developed a method of using this property of epilation by X-rays to treat cases of ringworm of the scalp, and, in order that the dosage

should be accurate, they devised small discs or pastilles of platino-cyanide of barium which, when placed in the path of the rays, turned from a lemon yellow to an orange tint. Two standard tints were prepared, "tint A," which corresponded to the colour of the pastille before exposure, and "tint B," which corresponded to the colour after an epilating dose had been given, provided the pastille had been placed midway between the anti-cathode of the X-ray tube and the skin and certain other conditions had been fulfilled. These pastilles came into common use for measuring dosage and are still employed in many countries, though various other methods have been devised, and an epilating dose has come to be known as a "pastille dose." It has been found that an epilating dose, if applied to the skin on the flexor aspect of the forearm, will usually produce a slight erythema and it is therefore sometimes spoken of as an "erythema dose." In the United States, largely under the influence of MacKee, with the modern apparatus available and using certain definite standards, this biological method of testing dosage is largely employed and this slight erythema dose has come to be called a "skin unit," which is used as the standard measurement of dosage. Whether, therefore, we use the term "pastille dose" or "skin unit," we are referring to the same thing.

*Dangers.*—Apart from the question of causing permanent alopecia from an excessive dose given to the scalp, it must be remembered that very considerable damage can be done to the skin either by a single overdose or by too frequent repetition of small doses. In the former case, varying degrees of erythema can be produced, extending in the more severe cases to blistering and ulceration of an extremely indolent and painful character; while, in the latter case, atrophy of the skin may be set up with pigmentation and telangiectases, which is not only extremely disfiguring but very prone to lead to subsequent ulceration and

epitheliomatous changes. It is therefore of great importance that in treating any condition, not only should the individual doses be accurate, but the course of treatment should be arranged so as not to overstep the danger limit.

We now turn to consider some dermatological conditions which respond satisfactorily to X-ray therapy.

*Ringworm.*—The value of X-ray treatment of scalp ringworm has given rise to the impression in some quarters that this method can be used for treating ringworm in any part of the body. This is, of course, *not so*. X-rays do not kill the ringworm fungus but act merely by bringing out hairs which are affected by the disease, and in which it is difficult to reach the fungus with ordinary anti-parasitic remedies. It is therefore only in ringworm of the scalp and beard in which X-rays are used as a rule. It is also usually unnecessary to employ X-rays in the suppurating ringworms of the scalp (kerion) and beard, as in these cases the affected hairs are loosened by the disease and can easily be removed by manual epilation. In this country, however, some 95 per cent of scalp ringworm is of the non-suppurative variety and for these X-ray treatment is the most suitable.

It is usually advisable to epilate the whole scalp, even though the disease appears quite localized, as the tendency to spread is very great and if a local area only is epilated, treatment of further patches is made more difficult. Uniform epilation of the whole scalp is readily performed by the method originally devised by Kienbock and improved by Adamson. Space does not permit a detailed description of the method but it consists essentially of marking out on the scalp five points, three in the middle line and one in each temporal area, each five inches from one another, and the exposures are arranged so that the central pencil of rays strikes the scalp at these points and that this

pened of rays at each point is at right angles to those at all neighbouring points. A single unfiltered "pastille dose" is given to each point and the overlap from each exposure is sufficient to give uniform irradiation of the whole scalp. In a case so treated the hair begins to fall about the eighteenth day and is complete in just over three weeks. In a certain proportion of cases a slight erythema associated with itching may occur towards the end of the first week and should be treated with sedative lotions. If no reaction has occurred by the middle of the second week, an antiseptic ointment such as Whitfield's should be smeared over the scalp daily after washing with soap and water.

R	Acid benzoic	.	.	.	.	.	gr. xxx
	Acid salicylic	.	.	.	.	.	gr. xv
	Ol lavend	.	.	.	.	.	m. iv.
	Paraffin mol	.	.	.	.	.	5 ii
	Ol coconis nucis ad	.	.	.	.	.	5 i

A light linen cap should also be worn until cure is complete. After epilation the scalp is examined at frequent intervals, if possible by the mercury-vapour lamp and a Wood's glass filter, by means of which any infected stumps can be seen, owing to their fluorescence. These can be removed by forceps and when the scalp is quite free the patient can be passed as cured. It is possible to get a very high percentage of cures in skilled hands.

In ringworm affecting the hairs of the beard, X-rays may also be used, but satisfactory epilation is not such a simple process owing partly to the irregularity of the surface to be treated, and partly to the bigger dose necessary to produce epilation in the beard hairs with the consequent tendency to produce an unpleasant erythema. It is better in such cases to give smaller doses, such as one-third of a pastille given twice a week for four doses. If at the end of three weeks the hair has not epilated, two or three similar doses may be



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prurigo; the type seen at the back of the neck in women; and the isolated patches occurring on the limbs; all these respond well to treatment given on the same lines as for eczema

Pruritus ani is due to a variety of causes, but for the so-called essential cases, in which no cause can be assigned, X-ray treatment is of great value and frequently produces a permanent cure. Fractional doses as for eczema can be given or a single pastille dose. Pruritus vulvæ may be treated in the same way, if other causes have been dealt with, but the prognosis is not so good in these cases.

*Erysipelas* —Small doses of X-rays have been found of great value in treating cases of erysipelas. Usually the affected area is irradiated with one-third of a pastille dose, and if extension occurs the dose is repeated in two days. A third dose can be given if necessary. A considerable number of cases respond to a single dose.

*Lupus vulgaris* —At one time lupus vulgaris was extensively treated by X-rays, but it has been found that patches can only be cured with a large number of treatments, and it is believed that this tends to the formation of epithelioma, so this form of treatment has been largely abandoned. Small doses are, however, useful in combination with Finsen treatment.

*Mycosis fungoides* —The cause of this curious disease in which numerous granulomatous tumours develop over considerable areas of the body is still unknown, and other forms of treatment have failed to influence its course. If left alone, it terminates fatally. X-ray treatment of the lesions, however, causes their temporary disappearance, and patients can be made comfortable and kept alive for considerable periods. Small doses are most suitable for ulcerating lesions, but, for the less prominent tumours, a full pastille dose may be given when required.

*Tumours* —Radium has largely replaced X-rays in

# Radon in Dermatology

By A C ROXBURGH, M A , M D , F R C P

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THIS article is intended to call the attention of readers of THE PRACTITIONER to the advantages possessed by radon over radium for use in the treatment of certain lesions of the skin both innocent and malignant. I had used radon in brass and silver tubes and glass applicators for a few cases of angiomas, keloids and rodent ulcers early in 1930, but after hearing R. T. Bram read a paper in June 1930<sup>1</sup> on the use of radon in seeds, I changed over to the use of seeds, and since then have used them in the following seventy-five cases in hospital and private practice:— 6 keloids, 3 cavernous angiomas, 4 sub-ungual warts, 52 rodent ulcers, 9 squamous epitheliomata; 1 small non-pigmented mole. The results have been extremely satisfactory, except in the case of the mole, which was quite unaffected.

Although little more than twelve months have elapsed since I began to use the seeds in malignant growths and it is therefore too soon to speak of permanent cure, yet in three cases of keloids which had resisted previous treatment by X-rays, in nine cases of rodent ulcers which had failed to disappear after previous applications of X-rays or radium plaques (beta rays), and in two rodent ulcers and two squamous epitheliomata which had recurred after surgical excision, the growths disappeared promptly after the insertion of radon seeds. These results are probably due to the fact that, the seeds being left *in situ* for seven days, the growth is subjected to a small quantity of almost pure gamma radiation for a prolonged period. This appears to be more effective than a large intensity for a short period, even though the total dose in milligramme hours may be the same.






*Physics of radon*—Radon is the first degradation

product of radium on its journey towards lead, and all "radium" treatment is equally treatment by radon, for the effective beta and gamma rays used in radium treatment come, not from the radium itself, but from its degradation products radium B and radium C, and all the atoms of radium have to pass through the stages of radon and radium A before becoming radium B and radium C. The only practical difference between treatment by radium and by radon is that in the former case the supply of radon is being replenished by the radium as fast as it is used up, whereas in treatment by radon the amount present is always diminishing, but at a known rate which can therefore be allowed for.

The loss of one alpha particle (charged helium atom of atomic weight = 4) from the radium atom leaves radon or radium emanation, the heaviest gas known, which after a few days fills any closed container in which the radium is placed. The loss of further alpha particles results in the formation progressively of radium A and radium B, while the loss of beta and gamma rays accompanies the change into radium C. Radium A, B, and C form a solid deposit on the walls of the container and constitute the "active deposit of short life." Radium C is converted into radium D which, with its degradation products E and F, constitutes the "active deposit of long life." The next stage, radium G, is lead. The early transformations of radium may be represented as follows (*see overleaf*).

The "half-life-period" is not half the total life, but is the life of the first half of the quantity originally present, i.e. the time taken for the radon to decay to half its original amount. The rate of decay becomes progressively slower as the amount present is reduced, so that the total life is very long, but for practical purposes radon may be taken to have decayed completely in one month. It has not really done so, however, for very small amounts of radiation continue

to come off from the active deposit of long life radium D, E, and F.

Emission	Alpha	Alpha	Alpha	Beta Gamma	Alpha Beta Gamma
					
Atomic weight	226	222	218	214	214
Name	Radium	Radon	Radium A	Radium B	Radium C
Half life period	1,600 years	3 825 days	3 05 minutes	26 8 minutes	19 7 minutes

Radon can be pumped off from a solution of a radium salt and can be enclosed in small capillary glass tubes or "seeds," or in larger tubes or flat glass bulbs as required. When radon is first pumped off it is free from active deposit and therefore its radiations are weak and it can be handled with comparative safety. After  $3\frac{1}{2}$  hours its radiation is at a maximum, owing to the formation and deposition on the walls of the tube of radium B and C. Thereafter its activity gradually falls off until it reaches half value in 3 825 days. The amount of radon in equilibrium with one milligramme of radium is called a millicurie, and at normal temperature and pressure only occupies a volume of 0 0006 cubic millimetre. A very large number of millicuries therefore could be contained in a small capillary tube and used as a very powerful source of radiation.

The dose of radon is measured as millicuries destroyed or as the equivalent number of milligramme hours. Radon decays at the rate of 0.75 per cent. in one hour, 16.6 per cent. in twenty-four hours, 50 per cent. in 3 825 days, 72 per cent. in seven days and 99.5 per cent. in thirty days. If therefore we start with a seed containing one millicurie of radon and it

is left in position for 3 825 days, 0.5 mc. will have been destroyed, if left for a week 0.72 mc., and if a month practically the whole millicurie. One millicurie destroyed is equivalent to 133 milligramme hours of radium. One milligramme hour is equivalent to 0.0075 millicurie destroyed. One millicurie for seven days = 0.72 millicurie destroyed = 96 milligramme hours (approximately)

One millicurie of radon in position for	1	2	3	4	5	6	7	8	9	10	30	days
Is equivalent to	22	40	56	68	79	88	96	102	107	111	133	milligramme hours (O'Donovan and Prain)

*Filtration or screening*—I have worked entirely with seeds screened with  $\frac{1}{2}$  millimetre of platinum. This cuts off all alpha rays and practically all the primary beta rays, and allows only gamma rays to emerge. Some secondary beta rays are given off from the platinum, but they are of small penetrative power and merely cause a slight necrosis immediately around each seed. This serves to make it easy to extract the seeds at the end of the treatment. The seeds I have used have all been supplied by the Radon Department of St Bartholomew's Hospital. They are little cylinders of platinum 6 millimetres long and 1.25 millimetres in diameter, the walls being 0.5 millimetre in thickness. Inside this cylinder lies the actual glass "seed." One end of the platinum case is a blunt point and the other is rounded with a stout black thread issuing from it.

If it is desired to use beta rays the bare glass seeds can be inserted in the growth and left there, or for surface application they can be attached to strapping or columbia paste (wax 40 parts, liquid paraffin 40 parts, finely pulverized sawdust 20 parts) and a filter of 0.1 to 0.2 millimetre of aluminium interposed to cut off the softest beta rays.

*Technique of insertion*—In the majority of the 75

cases I have treated up to date the seeds have been inserted into the thickness of the growth itself or under the skin immediately around it. If the growth is very small, e.g. comparable with the length of the seed itself (0.6 centimetre), one seed only need be used. A little novocaine (2 per cent.) is first injected underneath the growth with a fine hypodermic needle. A large sized intravenous needle is then pushed along the track made by the hypodermic needle. The intravenous needle should have a diameter slightly larger than the seed. The seed is then picked up in a pair of dressing forceps, holding it by the thread close to where this enters the platinum case. As soon as the large needle is withdrawn the seed is inserted into the hole left by

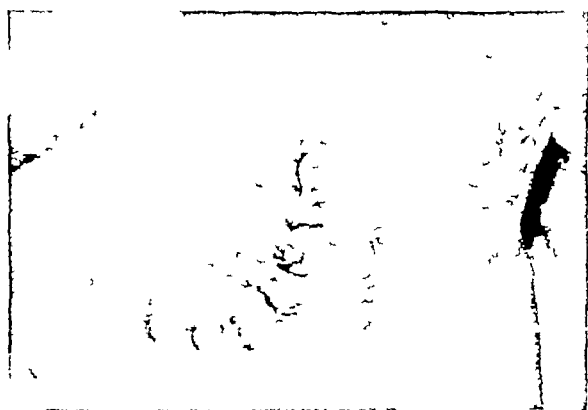


FIG 1 —Radon seeds with threads attached, inserted in keloidal operation scar in neck

it and pushed with the nose of the forceps until it lies horizontally under the middle of the growth. A little of the thread is pushed into the hole after it to prevent any tension on the thread from disturbing the position of the seed. The thread is then cut off an inch or so from the skin and a small collodion dressing applied to keep it in position. R. T. Brain uses a double-edged tenotome, 2 millimetres broad, instead of the intravenous needle, and perhaps it may be preferable. The seeds and their threads are sterilized by lying in

a gallipot of ether while the preparations are being made for their insertion. It is important to remember that seeds should under no circumstances be touched by the fingers, but should always be handled with a long pair of forceps.

Comparatively few rodent ulcers are small enough to be dealt with by a single seed, and if the growth is over 0.6 centimetre in length I always use two seeds, one at each end of the growth 1 centimetre apart. In larger growths the seeds must be inserted all round the periphery, either radially, at intervals of 1 centimetre, or tangentially, preserving the same interval of 1 centimetre between the centres of successive seeds. In no case should seeds be inserted in the centre of a growth. If the growth is too large to be dealt with by radiation from the periphery, an inner ring of seeds should be inserted. If seeds are put at the centre an over-dose there is certain to result.

*Dose* — Apparently about 100 milligramme hours of gamma radiation are required for each cubic centimetre of a rodent ulcer and 150-200 milligramme hours for the same quantity of squamous epithelioma. These doses are obtained from seeds of 1 1, 1.65 and 2 2 millicuries content respectively, left *in situ* for seven days.

In the majority of skin lesions one can neglect the thickness of the growth, which is seldom more than 1 centimetre, in calculating the dose required, and can therefore allow 100 milligramme hours for each square centimetre of surface in the case of rodent ulcers. If one is using two seeds for a rodent ulcer 1 centimetre in length, one still uses seeds of 1.1 millicurie each, because, being at opposite ends of the growth, less than half the radiation from each seed reaches the growth. If the seeds, instead of being merely at opposite ends of the growth, form a complete ring round it, that is when four or more seeds are used, the amount of radon in each seed should only be so much that the total amount present will



add up to 1.1 millicuries per square centimetre of growth (if rodent ulcers). For example four seeds, used to surround a rodent ulcer 1 square centimetre in area, should contain 0.28 millicurie each. If the growth is friable the seeds should be inserted under the skin at the margins of it, for if put into the growth itself one or more seeds may fall out of their position as the growth necroses under the influence of the radon. This may result in over-dosage at one point and under-dosage at another.

*Reaction* —Patients usually have but little discomfort while the seeds are *in situ*, and at the end of the week the collodion dressing is removed and the seeds pulled out by means of the attached thread. This causes no pain. In some cases a zone of erythema is now visible extending about one centimetre around each seed, but this may not be seen till another week has elapsed. Calamine lotion or a boric lint dressing is applied according to the amount of ulceration. The amount of reaction varies a good deal in different patients. If the dosage and spacing of seeds has been correct and the patient has not had previous X-ray or radium treatment it is seldom troublesome. In one of my cases where three seeds were inserted in a recurrence in the scar of an operation, and got too close together, owing to the liquefaction of the growth, a small radium ulcer was produced which took nineteen weeks to heal, and in another, which had had four previous X-ray treatments elsewhere, the ulcer took nine weeks to heal. In ordinary cases, however, the skin heals in four to six weeks. A good dressing for lesions which show an excessive reaction is the following —

R	Radiostol in liq paraffin (B D H)	-	1 part
	Lanoline	-	1 part
	Vaseline	-	1 part

The scars produced by radon treatment are very good, as was seen in some cases I showed at the

St. John's Hospital Dermatological Society on November 25, 1931.<sup>2</sup> In about four cases I have seen slight bluish staining at parts of the sites of certain of the seeds. Of the nature of this pigment I am at present uncertain

*Surface application.*—I have only applied radon seeds to the surface in eight cases up to date: two cavernous angiomas, one keloid, one rodent ulcer and four warts. The platinum seeds should be separated from the skin by 0.1 or 0.2 millimetre of aluminum, by a minimum of two thicknesses of adhesive strapping or by several layers of lint, or by  $\frac{1}{2}$  to 1 centimetre of columbia paste, in order to cut off the secondary beta rays given off by the platinum, which would cause ulceration of the skin. In the case of the lint and columbia paste, the effect is also to increase the distance of the seeds from the skin and so to produce a more even effect both in depth and on the surface. In non-malignant conditions a dose of less than 1 millicurie per square centimetre is probably sufficient (in naevi in babies about  $\frac{1}{4}$ — $\frac{1}{2}$  of this amount), but I have generally used seeds of one millicurie and allowed the reduction of the dose to be brought about by the distance by which the seeds are separated from the skin, or by reducing the number of days for which they are applied. The results in the eight cases mentioned have been good, although in the case of three of the warts there was temporarily rather an excessive reaction, probably as a result of placing the seeds directly on the warts without intervening strapping, and in one of the angiomas and in the keloid there was some temporary destruction of the epidermis

*Supply of radon*—As stated above, all my radon has come from the Radon Department of St. Bartholomew's Hospital, but this department only supplies radon to the members of the staffs of St Bartholomew's and other teaching hospitals. Radon can, however, be obtained from the London Hospital

and from the Radium Institute. The usual cost for private cases is 2s. to 2s. 6d per millicurie, plus 1s. 9d or so for each platinum filter. It should be ordered a few days before it is required. The day and hour at which it is to be used should be stated, because the seeds are made up of such a strength that they will have wasted down to the desired radon content by the time of insertion. The number of seeds, dose in each, thickness of filter, and whether threads are required or not, should be specified at the time of ordering.

The advantages of radon over radium in needles are the following —

(1) Its relative cheapness and its flexibility as regards methods of application and dosage

(2) The seeds being so small can be inserted into positions about the inner canthus, where there is little room for a needle

(3) The dose in each seed can be of any size required

(4) The dose in each seed is uniform along the length of the seed, which cannot always be said of a radium needle

(5) There is no need to lock up several hundred pounds in purchasing radium needles, which have to be kept in a safe place and may be lost or stolen

(6) The intrinsic worth of a seed is so small that there is no objection to allowing a patient to go away with a number of them *in situ*

(7) If something prevents the patient from returning at the proper time no great harm would be done, owing to the decreasing potency of the seeds.

Over radium in plaques radon seeds have the advantage that gamma rays can be used. Plaques, being usually of small radium content (2.5 or 5 milligrammes per square centimetre), have to be used unscreened or very lightly screened, so that their effect depends on the beta rays. If they are used with a  $\frac{1}{2}$  millimetre of platinum or 1 millimetre of lead filter to get the effect of the gamma rays, the exposure has to be

inordinately long. In my experience gamma radiation is preferable to beta radiation even for superficial growths, for I have seen so many rodent ulcers fail to disappear after beta radiation, or recur after disappearing, and then be subsequently successfully removed by gamma radiation.

The principal disadvantages of radon as compared with radium are the following:—

(1) The need to be within reach of a source of supply. Radon can, however, be sent by post.

(2) That one is absolutely dependent upon the technician who prepares the seeds for the presence of the stated dose in each seed. It is therefore essential to obtain seeds from an absolutely reliable source.

(3) The fact that radon decays to half value in 3.825 days is not a serious disadvantage, for in actual practice I find that one always leaves the seeds *in situ* for one week, so that 1.1 m.c. = 100 mg. hours, 0.55 m.c. = 50 mg. hours, 2.2 m.c. = 200 mg. hours, and so on.

If further information on the subject of radon in dermatology is required, reference may be made to papers by O'Donovan and Bram,<sup>3</sup> by R. T. Bram,<sup>4</sup> and to the textbooks of McKee<sup>6</sup> and Hazen<sup>7</sup> on X-ray and radium treatment in diseases of the skin. Skin cases treated by radon have been shown at the Dermatological Section of the Royal Society of Medicine<sup>1</sup> and at the St. John's Hospital Dermatological Society.<sup>2, 5</sup>

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# Some Uses of Ultra-Violet Radiations in Skin Diseases

By ROBERT AITKEN, M D , F R C P E

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IN dermatology, the long ultra-violet and the light rays are the most important. It is sometimes stated that the bactericidal rays are the important ones in the treatment of diseases of the skin, but, in my opinion, they are practically useless. If the organisms are on the surface, as in impetigo contagiosa, they can easily be killed by ordinary remedies. If they are deep, the short or bactericidal rays cannot reach them as these rays have little or no penetration. It is frequently claimed that the mercury vapour lamp is of more use in dermatology than is the carbon arc, but with this claim I cannot agree. Apart from the local treatment of lupus by pressing the water-cooled Kromayer lamp against the diseased part, there is nothing in the treatment of skin diseases which cannot be accomplished with the carbon arc as satisfactorily as with the mercury vapour lamp, provided the right type of carbon is chosen. For ordinary work pure carbon or the white flame carbon will give excellent results. If in certain conditions a more irritating effect is desired, e.g. in alopecia areata, this can be brought about quickly by the use of an iron-cored carbon. In few skin diseases is local radiation desired and in these exceptional cases it is an easy matter to screen the parts not to be radiated with towels, bandages or even smearing the parts with vaseline. A simple localizer, similar to those supplied with the mercury lamps, can be made for the carbon arc also.

Another reason for preferring the carbon arc is the uniformity of output and consequently the more satisfactory dosage which can be administered. It is not sufficiently realized how marked is the diminution of intensity of radiation from the mercury vapour lamp with use. According to Kinloch<sup>1</sup> the vacuum type shows a fall in output from 230 units to 90 units in 200 hours' burning and to 40 units after 400 hours. Some types show an even more marked reduction. Recently I tested a mercury vapour lamp and found that after 60 hours' use the output had fallen to less than one-fifth of its original intensity. Under such circumstances it is obvious that the dosage with the mercury vapour lamp must be haphazard.

Tuberculosis of the skin, both in its manifestation as *lupus vulgaris* and as *scrofuloderma*, stands foremost as amenable to treatment by radiations. It is not sufficiently realized how miserable is the lot of the patient who has extensive *lupus vulgaris*. As the condition is most common on the face, the disfigurement is considerable and such patients are usually shunned by others. It is now more than thirty years since Finsen demonstrated to the world the change which could be brought about in *lupus vulgaris* by concentrated arc light. The treatment by general radiations marks as great an advance on Finsen's original method as that did on the remedies previously employed, and a new vision of life has been given to the sufferers from this disease. The disadvantage of the Finsen treatment was the time taken to treat an extensive case. General radiations do just as well in extensive cases as in localized ones.

It is sometimes stated that general radiations alone will not cure *lupus*, but this is erroneous. We have unfortunately a large number of cases of *lupus* in Edinburgh and neighbourhood and after an extensive experience with the radiation treatment of this disease I have no hesitation in saying that *lupus* can be cured

by general radiation treatment. At the same time, however, it may not be desirable to rely on this treatment alone and I regularly employ other methods of treatment such as the application of trichloroacetic acid or other caustic in addition to the light treatment.

The type of lupus in which the most dramatic results are obtained is the catarrhal. Even within two or three weeks it is frequently found that the part is drier and looks healthier, but the clearing up of the catarrh ought not to be mistaken for the cure of the lupus, as is not infrequently done. Another type which does well is that in which the patches are rather swollen and turgid. After a few weeks the lesions become much flatter and soon are level with the skin. The dry flat type takes longer, but cure can be brought about with perseverance. If there is much fibrous tissue, usually from previous X-ray treatment, the progress is much slower, while still more stubborn is the thick warty type of lupus. The type of tuberculous lesion which is the most resistant to light treatment is the pseudo-elephantiasis type, and I have never seen much improvement brought about by radiations in these cases.

Scrofuloderma does well, as a rule. The discharge may become more profuse to begin with, when there is a sinus, but as the treatment progresses, the discharge steadily diminishes and finally ceases. The glands decrease in size and eventually disappear, while the skin infection steadily improves and cure is brought about. It is unfortunate that there is such delay in sending these cases for radiation, as the longer the duration of the disease the longer must be the course of treatment required to effect a cure.

*Alopecia areata* is a disease in which ultra-violet ray treatment has been claimed as an infallible cure. It is certainly a valuable remedy in many cases, but to speak of it as a specific remedy is to show a lack of knowledge and experience of the disease. The

condition is very capricious and often resists all forms of treatment, and the last remedy—and the last practitioner—always gets the credit of the cure. The mercury vapour lamp has been used by dermatologists in the treatment of this disease for more than twenty years and I am certain that not one of them would claim that every case is cured. Many cases fail to respond at all, even after prolonged treatment. There is no doubt that many cases do well, but I have seen quite a number become steadily worse even under vigorous ultra-violet radiations. In alopecia areata the doses to the scalp must be sufficiently great to produce a brisk reaction. The redness ought to be allowed to pass off completely before another dose is given. In complete baldness the head ought to be treated in sections at intervals of a few days rather than the whole scalp irradiated at one sitting.

*Furunculosis*, especially in its chronic form, responds well to radiations. Patients with this condition are generally much below par and a course of general radiations tones them up and enables them to overcome the infection. If there is only one large boil, the pain is speedily eased and the limpness soon passes off, but radiations are, perhaps, of more value in patients who have successive crops of boils.

In *sycosis* the results of radiation treatment are similar to the results of other treatment, sometimes very gratifying, sometimes very disappointing. It is not infrequently advised that exfoliating doses should be given for this condition, but as the causal organisms lie deep in the hair follicles, the rays which cause exfoliation cannot reach them and it is by raising the general resistance to the staphylococcus that improvement is brought about.

*Psoriasis* is another disease in which brilliant results are claimed for radiation treatment by non-dermatological writers, but no dermatologist ever seems to have attained such results. I have tried radiations



repeatedly in psoriasis and while in many cases I have had excellent results, in many others no success has been attained. The cases which respond are those in which the patches are thin; when the patches are thick they are more resistant. This is what happens with other remedies also.

On one occasion I was asked to treat a man with large indurated patches of psoriasis on which ordinary treatment seemed to make little or no impression. The radiations had apparently just as little effect and I advised him to discontinue the treatment. He resumed treatment with the ointment which he had been using without any benefit for a month before beginning radiation treatment, and within a fortnight he was about 50 per cent better. Evidently the radiations had in some way altered his skin and caused it to respond to an ointment which had previously had no obvious effect.

In treating psoriasis with radiations it is not advisable to give doses which cause a brisk reaction, as in this way the disease is not infrequently spread. The patch treated clears up but the surrounding skin immediately begins to show psoriatic lesions and the patient's last state is worse than his first.

In *herpes zoster* radiations are of use only in the relief of pain which so frequently accompanies or follows this disease. When the initial pain is severe it is frequently found that after even only one or two doses the patient is able to get better sleep. In this way considerable benefit is conferred, especially on old people. When the pain persists after the eruption has disappeared, radiations may also be employed with benefit. This is a point which does not seem to be sufficiently realized by many practitioners.

In *lupus erythematosus* radiations must be employed with great caution. It is well known that sunlight not infrequently aggravates the disease, though in other cases it is beneficial. For this reason the effect of the initial doses must be carefully watched and the treatment stopped at the first sign of deterioration. Patients who are receiving injections of any of the gold preparations used in the treatment of this condition, must on

no account be given radiation treatment because of the risk of a lilac discoloration of the skin being produced.

In *dermatitis* or *eczema* radiations are sometimes of value. In all such cases an attempt must be made to discover the cause as it is unlikely that radiations or any other form of treatment will cure the condition if the cause is still allowed to act. Many cases of *epidermophytosis*, for example, are still diagnosed as *dermatitis* and it is obvious that radiation treatment will not cure such a variety of *dermatitis*. Unless this and other recent advances in dermatology are kept in mind, mistakes in diagnosis and treatment will occur.

Cases of acute *dermatitis* are, as a rule, not suitable for radiation treatment although Lomholt<sup>2</sup> reports good results in acute *eczema* from concentrated arc light treatment. The chronic cases are the most suitable for radiations. When no obvious cause can be found, it may be that the condition is kept going by faulty metabolism, and the radiations would seem to alter this and cause them to respond in a gratifying way. One case may be quoted to illustrate this —

A practitioner who had a moist *dermatitis* of his hands, was sent to me for radiations. He wished to install apparatus for himself and came to me for advice as to the type he should procure. On seeing his condition I informed him that radiations might not be helpful and suggested that I should give him some treatment and see the response before he decided to get apparatus for himself. While under my care he used a simple ichthyol paste dressing which he had been applying previously. This was done to eliminate any possibility of a different application being responsible for any improvement or deterioration in the skin condition. By the time he had had thirteen doses his skin was completely well and has remained so since he completed his treatment three years ago.

While far from recommending that radiations should be given to every case of *dermatitis*, I do think that when the condition has resisted proper treatment, it is worth while trying the effect of ultra-violet radiations.

There is one type of *dermatitis* which does repay the time and trouble given in treating it with ultra-

repeatedly in psoriasis and while in many cases I have had excellent results, in many others no success has been attained. The cases which respond are those in which the patches are thin, when the patches are thick they are more resistant. This is what happens with other remedies also.

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continued

It has been suggested that the painting of the leucodermic patches with oil of bergamot in addition to the radiations has a beneficial effect on the condition, but there was no improvement on this patient's leucoderma after the combined treatment for seven months. It has been suggested that general radiation of the back could not possibly bring about a cure and that the patches should be carefully surrounded with some material which would screen the surrounding parts from the rays. I must confess that I do not see the point of such criticism. If the rays are going to produce pigment in the white patches, they should do so whether the surrounding parts are screened or not. In order to meet this criticism, however, I cut a hole in a piece of thin lead foil, carefully shaping it to the outline of the patch and placed it accurately on the skin so that the patch alone received radiations. The patch itself was rubbed vigorously with eau de Cologne and then radiated with a mercury vapour lamp. After six months of regular treatment the patch still remains as unpigmented as formerly. Redness was certainly produced, but that is not pigmentation, nor is it necessarily followed by pigmentation, a mistake which is not frequently made. Leucoderma is commonly seen on the exposed parts of the body in India and if ultra-violet rays had any beneficial effect no Indian would have this disease.

It is frequently stated that *acne* can be cured by ultra-violet ray treatment, but in my opinion this case ought not to be treated in this way. I readily admit that if there is much pustulation, this will clear up but that does not mean the cure of the disease. I have frequently been consulted by patients who have had ultra-violet rays for *acne* and who were thoroughly satisfied with the result of such treatment. The skin appeared to clear up, but within a few weeks

of the cessation of the treatment it was as bad as ever

Recently I saw a lady who had had a course of ultra-violet ray treatment for her acne three months previously and she presented one of the worst cases of acne I have ever seen. She stated that the condition had improved while she was having the radiations, but had become bad again almost as soon as they were stopped.

Many non-dermatological writers advise exfoliating doses, but the same result can be achieved by the use of a peeling paste and with more control over the reaction. It does not seem justifiable to put patients to the expense of a course of ultra-violet radiations when the same results can be obtained at a fraction of the cost with a peeling paste. In any case the results are not in the least comparable to those obtained with X-ray treatment and I would never advise a patient with acne to have ultra-violet rays. Andrews<sup>3</sup> recently has advocated the use of ultra-violet rays to clear up the pitted scars left by acne, but I have no experience of their use in this way.

Claims have also been made of cures in ringworm of the scalp treated with ultra-violet rays, but again such claims have been made by those not familiar with the disease or its treatment. The bactericidal rays cannot reach the fungus, which extends to the bottom of the hair follicle. The deliberate provoking of a brisk reaction on the patch is to be strongly condemned as such a reaction cannot be easily controlled, kerion may develop and a patch of permanent baldness result. The only satisfactory treatment of this condition is epilation by means of X-rays or thallium. Dermatologists have frequently had to treat in this way cases of ringworm of the scalp which were supposed to have been cured by ultra-violet ray treatment.

There is one use for ultra-violet rays in ringworm of the scalp and that is in diagnosis. A filter of Wood's glass is sometimes used to help in the diagnosis. This glass contains oxide of nickel and cuts out all rays above 3650 Å. U. When such a filter is placed between the source of ultra-violet rays and the child's head in a

darkened room the ringworm hairs will fluoresce a brilliant green, while the normal hairs do not. There is a risk, however, of overlooking ringworm if one relies entirely on this method, as Wigley<sup>4</sup> has pointed out that hair fully infected with endothrix ringworm completely fails to fluoresce, apparently because the cuticle of the hair is intact.

Ringworm of the body also is occasionally treated with ultra-violet rays, but ordinary remedies clear up this condition without much difficulty and there is no need to use radiations. In the same way it is wrong to attempt to treat impetigo contagiosa by ultra-violet radiations. An ordinary case of impetigo clears up in a week or ten days. If it does not, the treatment is wrong, or if the right treatment has been prescribed, the instructions for using it have not been properly carried out.

*Keloid*, *naevi* and many other conditions have been treated with ultra-violet rays, but other methods give better results and it does not appear to be justifiable to use radiation treatment under these circumstances. The treatment of such ordinary conditions with ultra-violet rays when better results can be obtained by the use of other remedies can only have the effect of bringing radiation treatment into disrepute.

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# Errors and Accidents of Treatment

By HENRY C SEMON, M.A., M.D., M.R.C.P.

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THE exhortation *Primum non nocere!* should be more carefully observed in dermatological than in any other branch of medical practice, for the patient can see as readily as he can feel the results of treatment. The besetting sin is over-treatment. Too much zeal was responsible for quite a considerable percentage of skin casualties in the late war, and even to-day it is often necessary to counteract the effects of sulphur or iodine dermatitis before coming to grips with the primary cause of the eruption or pruritic symptom. In most cases the patient is to blame, but it is still not sufficiently realized in medical circles that all accessible parasites and organisms are exceedingly easy to destroy, and when a weak antiseptic fails to achieve results, the cause of failure is inaccessibility rather than a specific resistance.

The case of *scabies* illustrates the argument: the acarus is accessible only at night time when it feeds and breeds on the surface of the body. A thin film of a weak parasiticide ointment or oil (the best for private use is undoubtedly mitigal (Bayer)) is applied to all parts except the head and neck, for three successive nights only. There is no need whatever to use a scrubbing brush, or open burrows mechanically with a needle. The inexorable laws of biology ensure that each generation of parasites will hatch out from the runs in 48 hours. It follows therefore that if all the adults on the surface are killed by the first application, there are only two generations to be accounted for, unhatched as yet in the burrows, and these will perish in the second and third anointings. What need, then,

for baths during the treatment? Of what value the application of sulphur in a vaporized form? Why use force and friction to ensure penetration? The skin cannot be penetrated by sulphur, it can only be irritated, as it very frequently is by those who ignore the fundamental principles of scientific therapy. And then the official B P sulphur ointment—i.e. 1-9 parts benzoated lard—is far too strong. For children under ten years of age it may be mixed with three parts of zinc ointment or vaseline, and for adults with equal parts. With B-naphthol 1 per cent ointment, with or without balsam of Peru, the results are just as good as with sulphur, and I have yet to see dermatitis or constitutional effects from its application.

The management of *impetigo contagiosa* often illustrates the risks of over-treatment. Most of the cases occur in the first decade, when the cuticle is still delicate and rather sensitive to all forms of chemical stimuli, and especially to maceration by soap and ointments. The former often causes round scaly evanescent patches on the face, the latter are inevitably applied to every type of eruption, whether acutely septic, as in the disease under discussion, or chronic, as in seborrhœa and psoriasis. The popular prescription for this is the ammoniated mercury ointment. Now impetigo is a vesicular disease, and therefore the aim should be to dry up the vesicles before they rupture and discharge their highly infective serous content over the surrounding skin, and other parts of the body by contact with the fingers, soiled dressings, and so forth. Some such purpose may have inspired the old habit of applying tincture of iodine. But this again is far too strong, and the element itself exceedingly irritating, even to normal skins on which, as is well known, it acts as an exfoliant. To these two actions, viz., irritation and exfoliation, is often added the macerating action of a relatively strong ammoniated mercury ointment, and the result in a case of impetigo



is just as might have been expected, copious discharge, excessive crusting, sepsis and general spread of the infection. All this would certainly have been avoided if the delicate and simple nature both of the infecting agent, a streptococcus, and the infected integument had been remembered. Frequent bathing with a weak mercurial lotion (e.g. lot. nigra B.P.) or with a 0.5 per cent solution of copper and zinc sulphate is sufficient to kill any streptococcus so close to the surface as in this disease, and if a little spirit of camphor (1 per cent) be added the tendency to desiccation will be enhanced; no dressings should be used.

*Ringworm*, whether of the glabrous skin or the scalp, is always painted with iodine, as soon as even a suspicion of its nature is current. On the body a weak dilute tincture does not do any harm and usually succeeds, but on the scalp it does no good whatever and may increase the difficulty of diagnosis, and thus postpone efficient treatment. "Ringworm" of the extremities, usually of the crutch or toes, is always severely irritated by iodine, and the ensuing eczematization may greatly hamper all therapeutic efforts along accepted lines. In these situations pending the acquirement of experience, lavage and foot-baths of a 1 in 5,000 solution of potassium permanganate should be prescribed. This it seems may be applied in acute dermatitis of almost any etiology. In Professor Ramel's clinic at Lausanne it was, until quite recently at any rate, the routine procedure even in exposed situations, such as the hands. It has a marked antipruritic effect, and in weaker solutions may be used for this purpose in a 30-gallon bath. Its effects are purely local, there is no danger of toxæmia by absorption, and in strong solution or in crystal form it is a valuable caustic in lupus vulgaris.

Tar is a most valuable drug applied in suitable cases and in the proper way. For eczema (allergic dermatitis) it is still the most reliable weapon. It must not be

used in septic cases, but there is very little risk of aggravating any stage of the disease if this is done, and the remedy is applied tentatively, first as a 1-2 per cent lotion, with or without lead, then, as desired or proceeds, in the form of a cream, or with 12-15 per cent paste, and finally, especially in the antecubital fossa and popliteal spaces, as a paint, mixed with an equal part of collodum flexile once or twice weekly.

Modern dermatologists are increasingly using hypodermic medication, for syphilis it has become the accepted method, and various drugs are administered intravenously and intramuscularly in weekly injections over many months and even years. Considering their number, it is surprising how few accidents are recorded; they are of two classes: (1) immediate and local as a result of sepsis, intolerance perhaps due to idiosyncrasy or faulty manufacture, or escape into surrounding tissue of a solution designed exclusively for intravenous use, and (2) the graver form in which toxæmia or generalized dermatitis sometimes lead to a fatal issue. Of class 1 it may be asserted that even the most skilful operator occasionally misses or partially transfixes a vein, and he always, or always should, anticipate this contingency. A few drops of the ordinary N A B in the subcutaneous tissues are quite



FIG. 1.—Result of the injection of solutions of N A B designed for intravenous use only, into the buttock.

sufficient to provoke a painful indolent infiltration lasting for weeks and disabling the ordinary manual worker from earning a living. If the accident

recognized at the moment of injection the needle should be left *in situ*, and the syringe carefully detached from it without shifting its position or plane in the tissues. From another syringe, which *ought always to be kept filled for the emergency*, 5-10 c.cm of normal saline are immediately injected in the actual plane of the misdirected N A B. solution. I believe this little manœuvre has obviated much unnecessary suffering over a number of years in my department at the Royal Northern Hospital. I have tried sodium thiosulphate as an antidote in this situation, but have not found it superior to saline, although, as I pointed out in 1924, it is of the greatest value in mercurial and bismuth stomatitis, and should always be used in the early stages of salvarsan jaundice and dermatitis. In such cases it must be given intravenously, and can be



FIG. 2—So called chemical ulcer following faulty technique in the injection treatment of varicose veins. A 5 per cent solution of sodium salicylate had been used.

repeated every day or on alternate days in 0.6-0.75 gram doses dissolved in 5-10 c.cm distilled water. It is quite innocuous, and Ravaut has administered up to 5 or 6 gram doses at a time. The widely adopted modern injection treatment of varicose veins occasionally leads to accidents resulting from an extraveneous leak at the time of the injection (Fig. 2). The most dangerous drug in this respect is sodium salicylate; in the

10 per cent solution, originally recommended by Sicard and others, it is definitely caustic, and the operator may prefer to use other solutions, such as the

quinine urethane or sodium morrhuate, which is popular in this, the country of its invention.

Serious results sometimes follow the administration of gold salts. In dermatology the drug has proved successful in quite a high percentage of cases of lupus erythematosus, and there is no other weapon of equal potency at the present time. The intravenous route is undoubtedly to be preferred, but occasionally veins may be exceedingly difficult to find, or the operator may not have sufficient experience for the manoeuvre.

A substance of equivalent gold content designed for intramuscular injection by a Continental firm was recently prescribed for two cases of lupus erythematosus, and administered by the intramuscular route in identical doses, suggested by the manufacturers' brochure, over a period of six weeks. The first case, a long standing example of the typical disease, was greatly benefited after six injections, and except for a little rheumatic pain and a metallic taste in the mouth, suffered no inconvenience.

The other, a woman aged 28, who had a small patch of lupus erythematosus on the right cheek for about 7 months, began to improve after four injections. After the fifth, a rash appeared on the forearms. In spite of this she was given the final dose of 1 gram a week later, when I was consulted on November 30 she had a severe generalized erythema, with a sort of "wooden" infiltration on the neck, not unlike cancer *en cuirasse*. A week later the whole body was involved, and the hands had begun to exfoliate (Fig. 3). Later, the exfoliation became general, her condition was extremely grave, and she was removed to hospital.

The percentage mortality in such cases is very high, and the patient was exceedingly lucky to escape with her life. It is al-



FIG. 3—Exfoliative dermatitis due to over treatment of lupus erythematosus with a gold salt given by intramuscular injection. The dermatitis was very severe and became general. Patient recovered after 8 weeks.

most certain that if no further injection had followed the warning rash that appeared after the fifth injection, this serious complication would have been avoided. It should also be noted, in spite of the manufacturers' edict to the contrary, that anything exceeding 0.25 gram of any gold compound is a dangerous dose. Successful results are frequently obtained with 0.1 gram given in weekly doses over a period of a month or two. Very much the same warning applies to salvarsan and its substitutes, and although toxic manifestations are liable to occur with quite small doses, such as 0.3 or 0.45 gram, if they do occur after 0.75 or 0.9 gram doses, it is difficult to avoid the conclusion that the patient was over-dosed, and might have escaped the complication on the smaller amounts.

With the advent of X-rays and radium, the accidents and risks of dermatological treatment were greatly increased. According to McKee and Andrews, two American authorities of repute, X-ray treatment can be applied with benefit in no less than 81 dermatoses, which is almost equivalent to asserting that they are universally applicable in dermatology. My own experience has confirmed that view to some extent, but it has also taught me never, in any circumstances, with the possible exception of malignant disease, to exceed the skin tolerance dose, which is just that amount of X-rays which will cause the hair to fall out in fifteen days after radiation. If this dose, which I regard as unnecessarily high (except in tinea tonsurans), has to be repeated, at least a fortnight or three weeks should intervene, and a careful watch kept, and the patient interrogated for the development of erythema, however slight.

This erythema is the first stage of an X-ray burn, and there is no dermatological condition which justifies its production. Since using a 0.5 aluminium filter in both hospital and private cases, I have never seen it, even after five or six applications of the sub-epilation dose I usually recommend for chronic and inveterate

area of the face or back.

Many patients have been overdosed for *pruritus ani* or *vulva*, and their condition rendered thereby the more intolerable. It is a good rule that if the symptoms are not relieved at all after two doses, no further attempt should be made, and even when the rays do good it should be remembered that it is better to stop short of a complete cure rather than expose the patient to the risk of an X-ray ulcer.

It would follow apparently that if large or repeated doses have to be given, the disease must be proportionately serious, and I am therefore tempted to assert that for relatively banal conditions like warts, particularly plantar warts, for which various more simple and relatively harmless treatments are available, neither the X-rays nor radium ought to be prescribed. I have twice seen a severe burn from this cause, and two cases were shown at the International Congress of Dermatology, Copenhagen, 1930 (Fig. 4). Fig. 5 depicts the

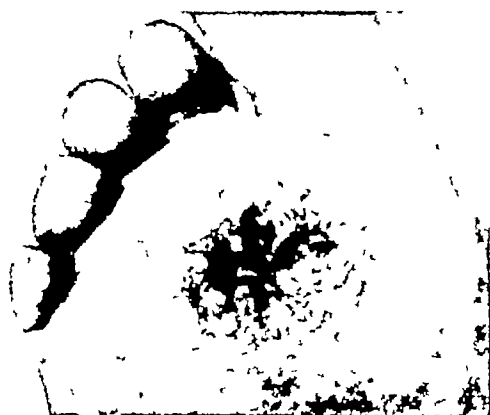


FIG. 4—X ray ulcer following treatment for a plantar wart



FIG. 5—Radio dermatitis and ulcer over Achilles tendon resulting from X ray treatment for lupus verrucosus

final result of an attempt to cure verrucose lupus of the skin over the Achilles tendon by X-rays. The patient had had frequent exposures over a number of

years, and it is safe to say that he would have been considerably better off at the time I was consulted if no treatment whatever had been applied. It is questionable if X-rays ought to be used for lupus in any form, except by a dermatologist of experience, who can evaluate exactly the possible benefits and risks. For psoriasis all treatment is temporary only in its effects. Repeated irradiation by X-rays is a medical misdemeanour, and would not be recommended or allowed in any clinic of repute.

Radiotherapy for *hypertrichosis* should be forbidden by law. It is curious how this danger to the community has been overlooked, for there are many totally unqualified and advertising persons who, for a fixed fee payable in advance, will guarantee to rid their clients of their unwanted hair, whether in the axillæ or on the face. It cannot be too emphatically stated that it is impossible either with the X-rays or radium to destroy the hair papilla without at the same time causing irreparable damage to the vascular, adipose and connective tissue framework in which nature has implanted it, and of which embryologically it is an integral part. Every textbook reiterates this assertion, and it is almost incredible on the available evidence that unqualified cosmetic specialists are still allowed to advertise and maintain the contrary in fashion and social journals from week to week. One firm actually has the temerity to invite the client's own doctor to attend to see for himself the harmlessness of the procedure! Will they be equally frank when, in from two to five years' time, the unfortunate victim presents herself with cutaneous atrophy, pigmentation, and telangiectatic changes of repellent and ineradicable type? I have seen three such cases recently, and expect to see many more in the future.

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# Skin Diseases in General Practice

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SKIN diseases in general practice may be divided, broadly, into the parasitic and the non-parasitic. In a short article it is only possible to give suggestions which may be of help to the practitioner in the diagnosis and treatment of the more common diseases. Frequently a good remedy is tried in a haphazard fashion without instructions having been given as to its use. A minute or two spent in giving directions often means the difference between success and failure. How frequently is rest in bed overlooked in treatment of the skin? Inflammations of other important organs are so treated, but inflammations of the skin do not receive the same obvious consideration. Then, again, sepsis, so frequently the power behind the disease, if not the actual cause, is forgotten. Surgical cleanliness must be insisted on if good results are to be obtained.

## ANIMAL PARASITES

The great difficulty in dealing with these pests is the liability to re-infection. They are more common in winter and usually more than one member of a household is infected. Scabies does not occur above the collar except in the infant, when the back of the neck and scalp may be infected from the mother's arm. As important as local medication are stoving and disinfection of clothing and bedding. Without these cure cannot be obtained. Gloves should not be overlooked in scabies treatment.

## VEGETABLE PARASITES

*Tinea capitis*—Diagnosis is easy, but confirmation can be obtained by microscopic examination of the



stumps or by examining the scalp under Wood's glass, attachment of which for the mercury vapour lamp costs only a few shillings. Under this, infected hairs give a greenish-yellow colour which cannot be mistaken. Previous application of iodine invalidates this test. Ringworm of the scalp is rare above the age of 16. Treatment consists in epilation either with X-rays or by administering thallium. Rubbing in ointment in the hope of cure is tedious, both to the patient and parent and of questionable benefit. In the hands of the expert X-ray epilation is devoid of risk, and cure is obtained in under three months. Thallium is suitable for those who cannot keep still for X-rays—usually the very young. The dose, 8.5 mg. per kilo. body weight, must be carefully calculated, and epilation occurs in 20 days. The disadvantage is the rapidity with which re-growth takes place, favouring re-infection. After epilation the scalp is examined weekly under Wood's glass to watch the progress of the case and to remove infected stumps. A washable cap should be worn during treatment and the scalp annointed with ung. hydrarg. ammoniatum.

*Tinea circinata*—In this the lesions are in rings, sometimes concentric, and in plaques. Diagnosis can be confirmed by microscopic examination of scrapings in liquor potassæ. In ectothrix infections the source can usually be traced to animals. Such lesions may be vesicular or kerionic, especially in the beard area. Ringed eruptions on the groins, thighs, gluteal cleft and axillæ must always be suspect; here infections spread rapidly because of the moisture and warmth.

In ringworm between the toes the epidermis looks sodden, and painful cracks develop on the plantar aspect. A superadded eczema may appear on the adjoining skin. In recurrent tinea of the trunk or limbs the toes should be examined for the source of infection. It is not always easy to find the fungus in scrapings from the toes. *Tinea unguum* may spread

from the surrounding skin, making the nails look brittle and opaque. Treatment of tinea circinata is simple and effective. Wash with soap and water and rub in ung. hydrarg. ammoniatum. Painting with tinct. iodi to cause exfoliation is useful.

Whitfield's ointment—

R	Acid benzoic	.	.	.	.	.	grs	xxx
	Acid salicylic	.	.	.	.	.	grs	xx
	Paraffin mol.	.	.	.	.	.	ʒi	
	Ol. coevis nucis ad	.	.	.	.	.	ʒi	

will clear ringworm of the groins and from between the toes. The ointment should be rubbed in night and morning after removing the sodden epidermis. Kerionic ringworm is treated as a septic condition as pustulation kills the fungus. Epilation of the beard area with X-rays may be necessary.

*Pityriasis versicolor*, due to the *Microsporon furfur*, is most frequently seen on the chest and intrascapular regions. It occurs in yellow or brown patches in those who perspire freely and do not change their underclothes often. The fungus can always be found. Washing with soap and water to remove the scale and rubbing in sulphur-salicylic ointment or vigorous rubbing with sodium hyposulphite lotion, ʒi to ʒi, will cure it. Frequent changing and disinfection of the underclothes are necessary.

#### MICROBIC INFECTIONS

Streptococcal and staphylococcal infections account for the largest number of cases of skin diseases. Streptococcal lesions are acute and vesiculo-pustular, staphylococcal are subacute and folliculo-pustular. Streptococcal infections are local, except when lymphangitis develops, while staphylococcal ones tend to lower the body resistance and become chronic.

Streptococcal infections—*pemphigus neonatorum* and *impetigo contagiosa*—are easily cured by local treatment, namely, opening the vesicles, removing crusts and scabs by starch poultices and cleansing with oil,

and dabbing on the following.—

R	Zinc sulphate	-	-	-	-	-	grs	vi
	Copper sulphate	-	-	-	-	-	grs	iii
	Aquam camph ad	-	-	-	-	-	℥	i

The organism is not resistant, so “strong” applications are unnecessary. Ung hydrarg. ammon,  $2\frac{1}{2}$  per cent., acts well, but must be rubbed in and applied on lint after cleaning.

Staphylococcal infections—*sycosis barbæ* and *pustular folliculitis of the scalp and thighs* are difficult to cure and liable to recur. In sycosis the hair should be cut short, not shaved, and the parts flushed daily by prolonged hot bathing. Rubbing in night and morning the following ointment is useful.—

R	Sulphur	-	-	-	-	-	grs	xx
	Hydrarg sulph rub	-	-	-	-	-	grs	v
	Ung zinci ad	-	-	-	-	-	℥	i

Epilation with X-rays is of great service in the chronic stages. Tonics and change of air are helpful, as are also daily exposure to the carbon arc lamp. Vaccines are only occasionally helpful. In pustular folliculitis of the scalp in the young thallium epilation may be tried if ointments fail.

*Furunculosis*.—In furunculosis attention to the general health is essential. Early opening is not advised, but application of Unna's mercury and carbolic plaster is useful. Yeast, especially fresh brewer's yeast, is of help, but calcium sulphide has proved valueless with me. Autogenous vaccines are sometimes wonderfully successful, as are also injections of collosol manganese every four or five days.

*Seborrhœa*.—The seborrhœic skin is dull and greasy, affording a ready soil for the growth of bacterial parasites. Many members of a family are often affected and the tendency is hereditary. It appears as the greasy scale on the infant's scalp, which later shows as pityriasis capitis or dandruff. The skin of those suffering from dandruff is often affected with

seborrhœic dermatitis; it is liable to attack and spread from the central line of the body. The axillæ and groins are often the seat of a resistant type of the disease. On the trunk it appears as a folliculitis or in circinate patches, which have to be distinguished from pityriasis rosea and tinea versicolor. Thorough treatment of the infant's scalp would prevent many of the later seborrhœas. It should be washed daily and the following ointment rubbed in.—

R Sulphur . . . . .	grs x
Acid salicylic . . . . .	grs x
Camphor carbol . . . . .	℥ xx
Paraffin mol ad . . . . .	℥ i

For the pityriasis of later life weekly washing with spirit soap and daily application of the following is satisfactory:—

R Eucresol . . . . .	℥ ii
Hydrarg perchlor . . . . .	grs ii
Ol ricini . . . . .	q s
Industrial spirit to . . . . .	℥ vi

For the trunk the sulphur-salicylic ointment acts well, but if acute a paste is preferable, such as:—

R Ichthvol . . . . .	℥ xx
Sulphur . . . . .	grs x
Zinc paste to . . . . .	℥ i

Cotton or linen must be worn, not wool.

*Acne vulgaris*—Closely allied to seborrhœa is acne vulgaris, which attacks the face and upper parts of the trunk in adolescents. The age factor is important, and intestinal disturbances may be present. Comedones are always present, some of which inflame, giving the typical acne pustules. These, when healed, leave a scar. Marked atrophy and pitting may occur without much pustulation. The halogens give an eruption simulating this disease. In treatment the general health should be attended to and exercise in the open enjoined. Local treatment consists in long continued daily bathing with hot water and soap. The lather, if rubbed dry and left overnight, causes a gentle scaling

which is helpful. This is preferable to ointments, which young people find irksome. Daily application of the following is helpful.—

℞ Potassæ sulphuratæ	
Zinc sulphate	
Calamin	- - - - - aa ʒi
Glycerin	- - - - - ℥ xxx
Aquam ad	- - - - - ʒiv

Vaccines will occasionally be found useful. Small doses of X-rays, especially in the indurated type, are often of value. Erythematous doses of the mercury vapour lamp are suitable for acne of the trunk. For the greasy, shiny face Sabouraud's lotion is useful, namely—sulphur precipitate 4 per cent in bisulphide of carbon. The lotion is explosive if brought near an open flame and smells badly. It is best put on in the open, when the smell rapidly disappears.

*Acne rosacea* is a chronic affection of the face of spirit drinkers and, more frequently, immoderate tea drinkers. Ulceration of the cornea is sometimes seen in this condition. Regulation of diet with application of the potassa-zinc lotion during the day and nightly rubbing in the following ointment will be found useful.—

℞ Sulphur	- - - - - grs x
Ichthyol	- - - - - ℥ xx
Resorcin	- - - - - grs xv
Ung zinci ad	- - - - - ʒi

#### TUBERCULOSIS OF THE SKIN

*Scrofuloderma*, associated with deep tuberculous lesions, and *lupus vulgaris* are the common forms of tubercle in the skin. *Scrofuloderma* is most common in the neck, but *lupus*, whilst it may occur anywhere, is most common on the face. It starts as a small nodule with an apple-jelly appearance through the diascopé. It is usually single and the spread is by peripheral growth. In *lupus* affecting the nose the nasal mucosa should be examined. Diagnosis of the initial nodule is most important as cure can be effected

by excision. The later manifestations can only be treated in clinics.

#### NON-PARASITIC GROUP

Dermatitis includes *eczema* and *inflammations due to occupation*. They start as an erythema and may go through vesiculation and pustulation or become chronic. Trade dermatitis should clear on removal of the cause, though cure is often delayed. In treatment, protective dressings should be constantly applied and, if acute, rest in bed is desirable. Protection from strong winds and sunlight is necessary. While attention to the general health is essential, local applications offer the best means for relief and cure. In acute cases lotions applied as wet dressings, without protective covering, soothe by evaporation.

R	Liq plumb subacet	.	.	.	.	3m
	Zinci oxid	}	.	.	.	aa 3ss
	Pulv amyli		.	.	.	
	Aquam ad	.	.	.	.	Oj

is useful. For night, linimentum calcis cum calamine is preferable. Crusts and scabs should be softened with starch poultice and removed with oil before dressings are applied. When exudation ceases, Lassar's paste acts well, ichthyol, 4 per cent, and, if itchy, camphor. carbolatum, 5 per cent, may be added. Tar paste is often useful, even in the acute facial eczemas of children.

R	Coal tar and zinc oxide	.	.	.	partes ii	mix
	Pulv amyli and paraffin mol	.	.	.	partes xvi	mix
	Then mix both					

A tar washed free from alkali is essential. This paste is also useful in chronic eczema. X-rays, in small weekly doses, are helpful in chronic itchy eczema.

The erythemata or toxic eruptions may be due to drugs, absorption of toxins or perverted digestive processes. The redness disappears on pressure, which distinguishes them from purpura. In *erythema multiforme* the eruption is symmetrical, favouring the extensor aspect of the limbs, purplish red in colour and

if the disease is extensive rest in bed during treatment is advisable It is best applied in a base as follows :—

℞ Kaolin						
Pulv amyli	-	-	-	-	-	aa ʒii
Paraffin mol	-	-	-	-	-	ʒiv
Chrysarobin	-	-	-	-	-	grs x
Acid salicylic	-	-	-	-	-	grs x

This is rubbed in night and morning until reaction is obtained, when a soothing ointment is necessary For the large, chronic patches X-rays are useful Internal medication always seems problematical Chrysarobin cannot be applied to the scalp, but the following can be

℞ Hydrarg ammon	-	-	-	-	-	grs xv
Liq picis carbonis	-	-	-	-	-	℥ xv
Acid salicylic	-	-	-	-	-	grs x
Paraffin mol ad	-	-	-	-	-	ʒi

*Papular eruptions* —Lichen planus is the most common, it appears as shiny-topped papules, which tend to aggregate and form plaques, giving a purplish or violaceous colour The inside of the cheeks may be affected, but cannot be diagnosed here unless papules are found on the skin. Rest in bed is essential in the acute cases and removal from home surroundings is often advisable. Thorough de-intoxication of the intestinal canal by administering 1 oz of Glauber's salts in the morning and fluids, but no solids, for 24 hours is satisfactory, next day ordinary diet is resumed Liq. hydrarg perchlor or arsenic may be prescribed Intramuscular injections of enesol are often helpful Locally, the following relieves the itching —

℞ Hydrarg perchlor	-	-	-	-	-	grs ii
Acid carbol	-	-	-	-	-	grs xx
Ung zinci ad	-	-	-	-	-	ʒi

For chronic patches X-rays are often useful

In conclusion, the largest number of skin diseases we see are simple and yield to simple remedies Cure-alls are not to be desired, but excellent results can be obtained from a limited number of well-chosen remedies if used in the proper manner

# Urticaria

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URTICARIA is a very common, well-characterized "type reaction" of the skin, brought about by a variety of agencies, some well understood and some quite obscure. The actual phenomenon of the urticarial lesion is the same as the experimental skin reaction called by Sir Thomas Lewis "the triple response". As Lewis's work is essential to the understanding of urticaria it must first be considered in some detail.

Firm stroking of the normal skin is followed by :  
(a) A local red reaction due to active dilatation of the minute vessels, including the terminal arterioles, capillaries and minute venules, this is strictly confined to the line of pressure. (b) A diffuse response due to relaxation of the strong arterioles producing a wide surrounding flush or "flare". These reactions occur on all normal skins.

Now in certain individuals these are followed by swelling of the skin, i.e. local œdema or "whealing". This constitutes *factitious urticaria* or *dermographism*. This whealing produced by pressure or slight trauma is often looked upon as pathological, but the passage from the physiological to the pathological in this respect is gradual; there is no dividing line. In young and perfectly healthy people whealing of the skin to firm stroking is not uncommon, a detectable swelling being found in about one-fourth of those tested, though a conspicuous wheal only occurs in about 5 per cent. The full reaction is, therefore, only pathological in degree, as a wheal can be produced on the skin of almost any normal subject by repeated stroking (6 to 10 strokes). The full reaction to stroking, namely, local



antigen-antibody interaction, even in the case of antigens which are not proteins but drugs or other chemical substances. Idiosyncrasy is a state in which an individual is intolerant to a substance to which the great majority of people are tolerant. This intolerance is nearly always, if not invariably, acquired as a result of sensitization. It is very difficult to prove that such a reaction ever occurs as a result of a first contact. That urticaria provoked, for instance, by egg, fish or pollen depends on the elaboration of an antibody, can be shown by Prausnitz-Kuestner's method of passive transmission (referred to as P.-K. reaction). If the serum or citrated blood of an idiosyncratic patient is injected intradermally into the skin of a normal individual the subsequent administration to the latter of the specific antigen whether intradermally or by mouth, will provoke a wheal at the site where the idiosyncratic blood or serum was injected and not elsewhere. This reaction is quite specific. In nearly all cases where the P.-K. reaction is present the idiosyncratic patient's own skin gives a strong, immediate reaction to inoculation with the antigen. This is urticarial in character and corresponds to Lewis's triple response. The antigen need not be a protein, in a case of codeine idiosyncrasy Low obtained a positive skin test. Even in those cases where the primary antigen is of protein nature, e.g. egg-white or fish, positive skin reactions and positive P.-K. reactions can be obtained by dialysates of these substances, which give none of the tests for the presence of protein.

When a person becomes sensitized to a substance he may react to it in different ways, for example, urticaria, eczema or asthma. The reaction type depends partly on the situation of the cells holding antibody, and this in turn depends partly on the nature of the antigen, e.g. primula attacks the epidermal cells, leading to eczema, pollen attacks the respiratory tract, leading to hay-fever and asthma, while aspirin and antipyrin

attack the cutaneous vascular apparatus, leading to urticaria. *Ascaris* extract or emanation, which can produce urticaria in 80 per cent of adults, never produces eczema. On the other hand, *primula* never produces urticaria. Partly it depends on the mode of entry: e.g. pollen normally causes hay-fever because it is inhaled, but if it is introduced into the skin of a sensitive patient urticaria results. Partly it depends on the individual. For instance, camomile, which to the vast majority is quite innocuous, will produce eczema in one idiosyncratic and urticaria in another. In the same individual the different organs may be quite independent in their sensitiveness, e.g. a patient may give a positive skin test to pollen without having hay-fever, and *vice versa*, though it is uncommon. Even the separate layers of the skin may differ in their sensitiveness. In cases of eczema it is the epidermis which is sensitized, and in urticaria it appears to be the deeper layers, perhaps the vascular endothelium in the cutis. At any rate, to evoke an eczematous response in a patient who reacts in this way to a substance, it is only necessary to lay the antigen on the unbroken skin. To evoke an urticarial wheal it is necessary to introduce the antigen by intradermal injection or scarification.

#### PREDISPOSITION

Though the actual mechanism of urticaria has, in some instances, become much clearer, we still do not know how certain individuals have a greater liability to become sensitized than have others. This tendency or liability is, to a large extent, familial. These families often have symptoms, such as vasomotor instability, which older observers would have summed up under the term "neuropathic". Perhaps there is an underlying deficiency of tone in the sympathetic or the endocrine glands which act with it, for the drugs which are most efficient in suppressing an

urticarial attack are chiefly those which either stimulate the sympathetic or depress the parasympathetic, such as adrenalin, pituitrin, atropine, thyroid and ephedrin.

The predisposition to become sensitized is not confined to any particular class of antigens. A predisposed individual during his lifetime generally becomes sensitized to a large number of different substances. But the predisposition to get urticaria from the other kinds of agencies (i.e. other than antigen-antibody interaction) is quite independent. Thus in a dermographic patient there is an abnormal sensitiveness to trauma and trauma only. The cells of the skin are damaged, so that they set free histamine, by very slight injuries, such as a firm stroke, but there is no *general* increase of urticarial reactivity, so that if histamine is pricked through his skin it does not produce any greater reaction than in a normal individual. He is, therefore, not abnormally subject to urticaria from other causes.

#### GENERAL ETIOLOGY

We have seen that urticaria can be brought about by trauma, other physical and mechanical agencies and by antigen-antibody interaction. With regard to the last, the source of the antigen is more often internal than external. A frequent source is the intestine. The antigen may be some moiety of the food, especially incompletely digested protein, or a product of bacterial decomposition or bacteria themselves. For, just as drugs like aspirin, antipyrin and quinine have their individual pharmacological action, and in addition can produce the common reaction type urticaria in individuals sensitized to them, so bacteria which have their individual pathogenic effects can also produce urticaria in sensitized individuals. Therefore all foci of infection can act as causes. I have several times seen attacks of urticaria recur, each time in association

with a sore throat.

Often the antigen appears to act indirectly by producing an intermediate or secondary antigen. There is excreted in the urine of the majority of people a substance like a protease which has been isolated by Oriel. He says that it is found in greater quantity in those suffering from urticaria and other allergic manifestations and especially during the attack. He states that it often gives a positive skin reaction in the patient from whom it was derived, but not in others. Further, the protease of a milk-sensitive patient can sensitize a guinea pig against milk and, conversely, milk can sensitize a guinea pig against protease of a milk-sensitive patient. It appears, then, that the antigen is excreted with, and incorporated in, the protease. In a patient, quoted by Oriel, who developed severe urticaria on taking aspirin, the following interesting facts were found: Between attacks neither aspirin nor his protease gave a positive skin test; after taking aspirin and the outbreak of the usual urticaria, his protease did give a positive skin test, but aspirin still did not, the protease now also evoked a reaction in the skin of other aspirin-sensitive patients. This shows that aspirin, at any rate in this instance, did not act directly on the skin, but only through forming a secondary antigen by combination with the protease. This may be one explanation of the unreliability of skin tests in the detection of responsible antigens.

So far, however, this protease theory of Oriel and his findings have not been corroborated. As Freeman points out, the crux of the matter lies in the alleged *specific* dermal reaction of this protease. If specific it is of the greatest importance in immunology, but if not it has no significance. Freeman, even with Oriel's active co-operation, was quite unable, at any rate as regards asthma and hay-fever, to confirm (a) the presence of protease in any greater quantity in the

urine of allergic patients than in controls, (b) that proteose prepared from the urine of asthma or hay-fever patients gave a specific reaction in their skins, whether taken during quiescent periods or periods of exacerbation. Norman Burgess has also been unable to confirm the specificity of proteose in cases of urticaria.

Acidity sometimes seems to be a cause. It can be brought about by physical exertion and, in certain cases by prolonged sweating. In one patient whose attacks of urticaria invariably followed profuse sweating it was shown that the sweat remained acid for a much longer period than in normal controls. It was further demonstrated, experimentally, that her skin reacted by whealing to buffer solutions of a  $p^H$  which corresponded to that of her sweat, whilst the skin of controls did not. Nervous and emotional shocks are the immediate precursors of outbreaks in some over-excitabile patients, and appear to be the only cause, the mechanism is not understood. All forms of urticaria are aggravated by big changes of temperature.

#### TREATMENT

In view of the very varied etiology it is essential to take a very careful and detailed history. After as far as possible excluding external influences, steps must be taken to remedy intestinal stasis and infection and remove other infective foci. The question whether or not the diet is directly to blame can be settled as follows. The patient is first kept for about a week on a strict milk diet. After that a full and varied diet is given, but with the complete exclusion of milk and its derivatives. If this procedure has no effect on the urticaria, no specific food can possibly be etiologically responsible. It is still possible that the trouble arises from a product of incomplete digestion of proteum. This can be combated by giving digestive tablets, such as panteric (Parke Davis) or anzypan (Napp). Kaolin may also be of value in preventing the absorption of

toxic substances. In urticaria associated with physical exertion or sweating the indication is for alkalis, which are also useful at the onset of certain other rhythmic types of urticaria. In purely nervous cases luminal, about gr  $\frac{1}{2}$  t d s., has been found effective. Acute attacks can generally be relieved by injection of adrenaline, 1 in 1,000,  $\frac{1}{2}$  c cm. Thyroid, ephedrine, and pituitary extract are also useful. In those instances where a definite antigen is detected the obvious treatment is to eliminate it, if that is practicable. If it is not practicable, one might hope to achieve a cure by specific desensitization. This nearly always fails. There are, however, various methods of non-specific desensitization which are of very great value. The most useful is auto-hæmotherapy. It is specially useful where the cause is entirely obscure. Blood is taken from the patient's vein and injected intramuscularly in the gluteal region once a week. The first dose should be 5 c cm., the second 7 $\frac{1}{2}$  c cm., the third 10 c cm., and the fourth 10 or 15 c cm. Generally three or four injections are enough. If they have not produced obvious improvement, further injections will not help. Other substances which have been used for this purpose include preparations of milk, such as aolan given intramuscularly, peptone intravenously, or sodium thiosulphate intravenously. Magnesium hyposulphite has also been recommended, but I have not seen good results. Calcium gluconate given intravenously or intramuscularly sometimes produces striking temporary improvement, but it is generally of short duration.

“parakeratoses” which mimic it clinically.

This rather difficult microscopical diagnosis of psoriasis is possessed of considerable practical importance because upon it depends the prognosis of the individual patient, for while we cannot, alas, promise a permanent cure of psoriasis, appropriate treatment will effect this without a great deal of difficulty in those other conditions in which the clinical picture is so similar while the pathological picture is so profoundly different. This work has also an important scientific significance, for it provides a strong argument against the dermatologists who are inclined to think that psoriasis, seborrhœic dermatitis and the seborrhœids are all modifications of what is essentially the same pathological transformation of the epidermis.

While the etiological problem of psoriasis remains unsolved it is unreasonable to expect that the treatment of the condition can be put on a satisfactory basis, but something has been done to strengthen the hand of the practitioner during recent years. Attacking the disease from its constitutional aspect efforts have been made to apply the principles of “protein shock” to this problem. It has long been noticed that in patients who develop a high temperature the eruption usually disappears, and attempts have been made to obtain the same result by the injection of such bodies as T.A.B. (administered by the intravenous route), sterilized milk and certain sulphur compounds, but it cannot be said that striking results are often obtained. In all probability the reason is that it is very difficult to maintain in healthy people (and sufferers from psoriasis are usually healthy enough in other respects) a sufficiently prolonged elevation of temperature to produce the desired result. Perhaps the most important new preparation introduced for the treatment of psoriasis in the last few years is colloidal gold, which we owe to Dr. Noxon Toomey, of St. Louis, U.S.A. He originally employed the fluid

commonly used in a laboratory for the Lange colloidal gold test of the cerebro-spinal fluid. This contains 0.031 grams of metallic gold per 100 c cm., and he gave it in doses of 2 to 4 teaspoonfuls three times a day, but subsequently he used a stronger solution, or, rather, suspension of gold made by dissolving gold tribromide in bromine water and subsequently driving off the bromine by means of very gentle heat. For the details of the preparation of this re-agent the reader is referred to Noxon Toomey's article.<sup>2</sup> The author claimed that all the cases treated by colloidal gold improved without exception, and this although it was permitted to act entirely unsupported by other methods of treatment either internal or external. At the time he published his paper he had treated over 20 cases. He also says that treatment by gold, given by the mouth, is quite free from unpleasant complications, and is not, as one might expect, expensive. It may also be added that other dermatologists have employed gold in the form of sanoerysin in the treatment of psoriasis, but the reports are not very encouraging.

Attempts have been made by various workers to treat psoriasis on dietetic principles. Twenty years ago Duncan Bulkley<sup>3</sup> preached with great vigour the efficacy of a strict vegetarian regime in the cure of the disease. He permitted neither milk nor eggs to his patients and claimed very good results. The severity of the method, however, was a great drawback, and other dermatologists who attempted conscientiously to follow his instructions were unable to confirm his results. Consequently the vegetarian regime as a specific for psoriasis has long since fallen into disrepute.

Latterly Levin and Silvers have published a preliminary report<sup>4</sup> on the treatment of psoriasis by means of a salt-free diet. It is perhaps cynical to remark that salt-free diets have become fashionable in



therapeutics during the last few years, but these workers point out that in psoriatics there is a decided tendency to a concentration of the chlorides in the sweat to a higher figure than is normal, while the psoriatic lesion itself does not sweat at all. For this reason they state they decided to try a salt-free diet in psoriasis. They gave a diet consisting mainly of vegetables, fruits, cooked cereals, cream, salt-free bread, cottage and cream cheese, fish, occasionally lamb chops, coffee and tea. All the cases treated were confined to hospital, the only auxiliaries to treatment were sweat baths (which we presume mean Turkish baths) and local application of cold cream or boracic acid ointment in order to keep the skin comfortable. The first three patients so treated had all suffered from obstinate forms of the disease which had resisted the usual methods of treatment but which yielded completely to the regime indicated within two months, and the authors report that all the other patients now under observation are doing well, but they emphasize the necessity for strict supervision.

To some extent Levin and Silvers were inspired in their attempt to treat psoriasis dietetically by previous work on the metabolism of psoriatics published by van Kerckhoff<sup>5</sup> and Gans<sup>6</sup>. Kerckhoff pointed out that one unfailing characteristic of a patch of psoriasis was a complete absence of melanin in it. Now melanin is formed in the normal skin by a process of oxidation within the lowest layers of the epidermis from easily oxidizable substances—the pre-pigments. Clinically one may observe an illustration of this absence of pigmentation in any case of psoriasis in which rapid disappearance of the lesion has been brought about by vigorous treatment with chrysarobin. The sites of the cured patches are always perfectly white and stand out as pale islands in a pigmented expanse for a few days before the normal oxidative processes are re-established and provide the

usual amount of pigment.

Another argument in favour of the theory that there is a slowing up of the oxidative processes in psoriasis is to be found in the action of certain remedies for the condition—namely, dioxy-benzol and dioxy-anthranol, which can only be explained on the supposition that they cause a sensible increase in the rate of oxidation. Gans<sup>6</sup>, on the other hand, has shown that in areas of skin affected by psoriasis there is a tendency for the tissue reaction to swing further towards acidity than in the normal skin. He has been able to demonstrate this by the behaviour of fresh sections towards neutral red dye. This colour is destroyed the more quickly it comes in contact with an alkaline body. Since psoriatic patches remain dyed by it longer than normal skin, it follows that in psoriasis the reaction of the tissues is less alkaline. This demonstration accords with van Kerekhoff's observation that the processes of oxidation are slowed down in patches affected by psoriasis, for oxidative metabolism is slower in an acid medium. A further question now arises as to how far the tissue acidification with consequent inhibition of oxidation is to be ascribed to stagnation in the capillaries, an observation made long ago by Unna and frequently confirmed since. Van Kerekhoff has attempted to increase the oxidative capacities of the epidermal cells by the application of compounds of manganese, which have the property of greatly increasing the oxidizing power of oxidases. His results have not yet been published, but it is stated that he has obtained distinct improvement in many cases of psoriasis.

On the assumption that the acid products of metabolism were constantly discharged into the damaged tissue from the blood, Gans attempted to diminish their effect by daily doses of sodium bicarbonate, but quite without success. Subsequently he tried the administration of ammonium chloride on the chance

that the concentration of acidity in the skin left the remainder of the organism with a tendency towards "alkalosis." But the results of giving this compound were unexpected and startling, for in all cases it was followed by a marked increase both in the extent and the severity of the eruption and its use had to be abruptly discontinued. On the other hand, these detrimental effects do throw a certain light upon the pathogenesis of psoriasis, for they show the importance of the disturbance of the normal acid-alkaline balance in its production, a point which may ultimately be turned to therapeutic advantage. Indeed, it is possible that in the limitation of the sodium chloride intake Levin and Silvers have found a means of controlling the tendency of the psoriatic subject towards the excessive production of acid in the skin, and the subsequent progress of their efforts in this direction, which are still too recent for either confirmation or contradiction, by their repetition on the part of other workers will be awaited with interest by dermatologists.

Meanwhile the older and more conventional methods of treating psoriasis by various external applications still hold the field. Nothing has yet been discovered for the dispersal and removal of an obstinate and severe outbreak of psoriasis other than intensiveunction with chrysarobin ointment as strong as the patient can stand without the production of a severe inflammatory reaction. In a strength of a drachm to the ounce of vaseline, vigorously rubbed in twice daily, with the patient kept in bed, this drug will almost always remove a crusted and persistent eruption within three weeks. Its disadvantages, however, are very considerable and are well known. Not the least of these are the staining and ruination of the bed and underlinen, and unless the patient is able to consecrate the necessary time wholly to the purpose and remain confined to bed during the treatment, it is better to avoid the use of chrysarobin altogether and

to employ other and less objectionable substances. Recently Messrs. Bayer have introduced a preparation known as eignolin, the chemical name of which is di-oxy-anthranol and which they describe as chrysarobin minus a methyl group, for which they claim results equal to those obtained from chrysarobin without its disadvantages. It certainly possesses but little of the pigmentary power of chrysarobin and appears to give good results without the necessity of confining the patient to bed. It may either be made up into an ointment in the usual way or employed as a paint, dissolved in chloroform. As stated above, its effects are due to its power of increasing the intensity of the oxidative processes which take place in the epidermis. The same explanation is also true in the case of ultra-violet light, which has of recent years been much in vogue as a treatment for psoriasis. There is no doubt of its effect in some cases and it has the advantage that it is a clean and pleasant form of treatment and most patients enjoy light baths. Apart from these conveniences it is not, however, so generally effective as chrysarobin, and like it, it only acts locally. It has no constitutional power of preventing the outbreak of an eruption although it does seem to restrain the appearance of lesions on those parts which are regularly exposed to its effects.

Illustrating this I may mention the case of a lady who while actually enjoying a season's sunbathing at a Mediterranean resort was attacked by psoriasis for the first time in her life, but while she was still frequenting the beach no lesions appeared except on the area of her skin actually covered by her bathing costume. Even the narrow shoulder straps were sufficient to nullify the inhibitory action of the sun on the disease and their position was marked by a line of typical spots of psoriasis "*en goutte*." On returning to this country the psoriasis spread to the limbs and neck.

It is, too, a matter of common knowledge that sufferers from psoriasis are often less affected by their infirmity when resident in hot climates, where there is more temptation to exposure of the cutaneous surface to the elements than there is in this country. But it

that the concentration of acidity in the skin left the remainder of the organism with a tendency towards "alkalosis" But the results of giving this compound were unexpected and startling, for in all cases it was followed by a marked increase both in the extent and the severity of the eruption and its use had to be abruptly discontinued. On the other hand, these detrimental effects do throw a certain light upon the pathogenesis of psoriasis, for they show the importance of the disturbance of the normal acid-alkaline balance in its production, a point which may ultimately be turned to therapeutic advantage. Indeed, it is possible that in the limitation of the sodium chloride intake Levin and Silvers have found a means of controlling the tendency of the psoriatic subject towards the excessive production of acid in the skin, and the subsequent progress of their efforts in this direction, which are still too recent for either confirmation or contradiction, by their repetition on the part of other workers will be awaited with interest by dermatologists.

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# Eczema

By G. B. DOWLING, M.D., M.R.C.P.

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ECZEMA is not a disease: it is a reaction of the skin of a special type, which is brought about by an infinite variety of causes. It is the commonest of all cutaneous reactions, and probably the most universally recognized. Although a diversity of clinical forms exists, its morphological characteristics, both clinical and histological, are on the whole well defined and the diagnosis is not often difficult. The diagnosis of eczema without an accurate grasp of most if not all of the factors concerned in its development is, however, useless. At the present time, owing to the gradual accumulation of valuable clinical and experimental observations, the etiological factors in eczema are far better known than they were a generation ago. Above all it is recognized that there must be a special predisposition, whether inborn or acquired, to react in the form of eczema to one or a number of causal factors. But it must unfortunately be admitted that a great number of important questions concerning the condition remain unanswered.

In this article an attempt will be made to lay special stress on the nature of these unsolved problems and on the more important of the established facts concerning the etiology and pathogenesis of eczema. To avoid confusion it is advisable to approach the subject from three distinct angles, namely the clinical manifestations and histology, the etiology, and finally the pathogenic mechanism of eczema.

## CLINICAL MANIFESTATIONS AND HISTOLOGY

These are so well known that a very brief description of them will suffice. Eczema may be found associated

is important to remember that in all forms of light treatment it is essential that there should be produced an *active* hyperæmia of the skin, not a *passive* hyperæmia or stagnation of the blood in the capillaries, a state of affairs which is always detrimental to the physiological functions of the skin. Hence those who reside in hot climates should try to get the benefit of light rays without overheating the skin and without the production of an inflammatory erythema. Moreover, it is probable that very hot baths, especially if prolonged immersion is permitted, are to be avoided by those who are liable to psoriasis. The stagnation in the capillaries which is a constant feature of the blood-flow through the psoriatic patch must be encouraged by such treatment, while it seems very likely, although I do not know any proof of it, that general cutaneous hyperæmia and consequent general capillary stagnation produced by a hot bath would encourage the spread of the eruption to other parts.

For the present, then, we must rely in our efforts to control psoriasis by our well-tried remedies, reinforced by the more recently introduced di-oxy-anthranol (or cignolin), while encouraging our patients to expose themselves as much as possible to ultra-violet light derived either from the natural sun or from artificial sources, and hope that research on biochemical lines will soon give us more help in unravelling the pathogenesis of this baffling disorder and enable us to relieve more effectually the numerous patients who suffer from it.

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with one or several of the following erythema, cedema of the skin, vesiculation, weeping, crusting, desquamation and lichenification. These changes may succeed one another in stages or may co-exist, or one phase may alone be present or may predominate.

It is highly important to preserve an accurate mental picture of the histological changes present in eczema, which, as Darier points out, merely brings the direct examination under closer observance than is possible with the naked eye or lens. To quote from Darier's admirable description: the distinguishing feature of eczema and peculiar to it is spongiosis.

This consists of an intercellular infiltration of plasma in the Malpighian body as the result of which the Malpighian cells are separated one from another and deformed. Although at first preserving their filaments of union these eventually rupture, spongiosis is dispersed in little foci more or less closely aggregated, in the centre or towards the edges of which may be seen little spaces deprived of cells, these are microscopical vesicles. The large vesicles of eczema visible to the naked eye result from the distension of these foci and the inflation of the smaller vesicles and are usually more or less loculated. The fluid is derived by a process known as exoserosis from the subjacent capillaries, and in the vesicles and among the Malpighian cells are found a variable number of migrating lymphocytes, the vesicles may also contain detached epidermal cells. When secondary infection of an eczema takes place polymorphonuclear leucocytes become added to the migrating lymphocytes.

To spongiosis and vesiculation is secondarily added acanthosis, or multiplication of the Malpighian cells leading to increase in the depth of the epidermis, particularly in the interpapillary portion, and parakeratosis, or failure of the Malpighian cells to keratinize in the normal way so that the superficial cells retain their nuclei. These imperfectly keratinized cells lack the resistant quality of the normal horny layer and become desiccated as the result of exposure to air and form the desquamated scale of eczema. The dermal lesions consist of vaso-dilatation, cedema, and infiltration with mononuclear cells disposed around the cutaneous vessels.

*Clinical varieties.*—In acute eczema, vesiculation on an erythematous and cedematous base is generally present, in subacute and chronic eczema the greatest variety of clinical forms is found. Some are predominantly weeping and crusted, others dry and scaly. Such terms as vesicular eczema, erythematous, weeping, impetigenous, crusted, keratotic, papular, papulo-

vesicular and lichenified eczema explain themselves. They are applied to different phases of eczema and have no etiological significance.

The clinical varieties of eczema are also named after their configuration and regional distribution, and the terms intertriginous, nummular, flexural, generalized, and dysidrosiform eczemas are employed often for the better definition of the various types. The configuration and distribution of eczema generally give some indication of the causal factors. Thus eczema of the hands and forearms suggests an occupational or at least an external exciting cause. Acute erythematous eczema of the face suggests that the cause may be a volatile irritant, or that the patient may be sensitive to physical stimuli such as sun or wind.

In intertriginous eczema of the large folds in an obese subject, intertriginous friction and hyperidrosis may be the important factors, or these factors may provide a suitable soil for mycotic or microbial infection. An intertriginous distribution, whether the large or small folds be affected, suggests an infective origin. An intertriginous streptococcal infection often forms the starting point of eczema in the neighbourhood of the postauricular folds, the labial commissures, the angle of the nares, the canthi and perianal region.

Chronic flexural eczema with lichenification is most often found in cases belonging to the eczema-asthma group, and is then often associated with other features common in this variety, such as a family history of asthma or eczema, or related allergic diseases, a history of eczema in infancy, or asthma or hay fever and of alimentary or cutaneous sensitivity to various food-stuffs. An earthy complexion, and a peculiar mask-like rigidity of the features are generally present in severe cases. In dysidrosiform eczema the possibility of mycotic infection should be considered, though this variety may also be provoked by external irritants, by simple hyperidrosis, or form part of a more widespread

eczema.

Nummular papulo-vesicular eczema is a special variety which appears most often on the thighs, arms, and forearms, but which may sometimes have a generalized distribution. It may occur as the result of auto-sensitization from a chronic patch of eczema, or it may be of toxic origin.

Eczema of the scalp is usually infective; it may complicate impetigo or the scalp may be invaded by impetigenous eczema affecting primarily the post-auricular folds. Primary seborrhœic eczema is also common on the scalp.

Eczema of the face in infancy may be caused simply by external irritants, or many complex factors may take part in its development, including an inherited allergic diathesis. As in older children eczema of the scalp in infancy may be of infective origin. Eczema of the napkin area is usually due to the irritant action of fæces and urine, though occasionally to thrush infection.

Seborrhœic eczema is a special type, the primary lesion of which is a dry red perifollicular papule of about the size of a pin's head, or a group of papules. In the course of days the lesion spreads centrifugally, always by the formation of new papules, while the original papules disappear to give place to superficial scales, usually fawn coloured, and greasy to touch. Seborrhœic eczema is closely related to dandruff and is found principally on the scalp, the chest and interscapular regions. The fact that this condition is undoubtedly a variety of eczema has been demonstrated histologically by Civatte. There are several clinical varieties of seborrhœic eczema, including a rare generalized erythrodermic form, which cannot be described here.

#### ETIOLOGY

The causes of eczema are predisposing and exciting. Among general predisposing factors the most important is heredity. The patient is a member of a family of

whom one or several members have suffered from one or more of the manifestations of group sensitivity or allergy, especially eczema, asthma, hay fever, and urticaria. Among other predisposing factors faulty hygiene, alcoholism, overwork, nervous exhaustion, digestive disturbances, constipation, chronic colitis, pregnancy and lactation, the menopause and diabetes may be mentioned; but the rôle of these factors, though undoubtedly of great importance, is not at present capable of more than vague definition. No constant alterations in the excretory functions of the organism, the nitrogenous and carbohydrate metabolism and the acid-base equilibrium in the blood have been found in eczema. On the other hand, obesity, seborrhœa, hyperidrosis and varicose veins are local predisposing causes which have direct relationship to the eczema with which they are sometimes associated. Local predisposition may also be brought about by prolonged exposure to an irritant or by manual work, especially in wet occupations.

The exciting causes are classified as external or internal, the latter reaching the skin by way of the blood stream through the digestive apparatus and, perhaps, sometimes through the metabolism of the subject. They are innumerable and infinitely varied; every one would, perhaps, be eczematous were not these causes effective only in subjects predisposed to react against them in the form of eczema. The great majority of eczematous irritants are, in fact, normally harmless substances, and are eczematogenous only for patients with exalted sensitivity towards them.

*External causes* —In discussing external causes it is necessary to distinguish clearly between eczema and what may properly be regarded as dermatitis. The word dermatitis is often applied to all cases in which a known irritant is the chief causal factor. Those who try to distinguish between eczema and dermatitis in this way separate from eczema all cases in which the

exciting cause is known, including those in which contact with the irritant is brought about through occupation, those provoked by physical stimuli such as sunlight and cold wind, by substances, such as drugs and foodstuffs, which reach the skin through the blood-streams, by infections of the skin such as impetigo, streptococcal fissures, varicose ulcers and other septic lesions, and by certain ringworm infections. They reserve for eczema only these cases in which a marked hereditary or acquired predisposition to eczema exists or in which the exciting causes are unknown, and they claim that, in due course, when the etiology of all varieties of eczema is known the term will be eliminated altogether. This attitude is unsatisfactory because it is obviously useless to employ different names for the same process, one must dispense with either eczema or dermatitis, moreover, the word dermatitis seems to imply a simple inflammatory reaction rather than one as complex as eczema.

If an acid or alkali in suitable concentration, or any normally irritating substance, be applied to the skin, an inflammatory reaction comparable to a first degree burn, consisting of erythema and perhaps vesiculation, will follow. This is a normal reaction and it will subside after the removal of the irritant. The same substance may in a sensitive subject produce a severe reaction even when applied in high dilution, and the reaction may spread beyond the area to which the irritant was applied and persist for a long while after its removal. In such cases the reaction generally presents the clinical and histological features of eczema. The term dermatitis should be reserved for the former reaction, and though it may at times be difficult to determine the point at which dermatitis ends and eczema begins, the distinction is, as a rule, fairly obvious. But the most important feature of eczema as opposed to dermatitis is that the irritants which provoke it are almost always harmless to normal subjects.

The external eczematogenous substances include antiseptics such as lysol, phenol, picric acid, formalin, iodoform, iodine, sulphur, mercurials; camphorated liniments and other stimulating substances used in external therapy, aniline dyes, especially paraphenylenediamine, used for dyeing hair and fur; tetrachlorethyl, amyl alcohol, lime and cement, french polish, turpentine, potassium bichromate, sugar, flour and dough, crude oil, paraffin and petrol, soda, and soap and water. The emanations of various plants, especially primula obconica, rhus toxicodendron, chrysanthemum, tulips, anemones, clematis and other flowers, hops, teak wood and sandal wood. These are a few of the better known external eczematogenous irritants; there are hundreds of others and their number is constantly increasing with the growth of industrial science. It is possible sometimes to gain valuable information regarding the external causal factor in eczema by means of what are known as patch tests. In these one or a number of suspected substances are applied for from one to twenty-four hours under occlusive dressings to unaffected portions of the skin, preferably in the neighbourhood of the affected areas. A positive reaction consists of erythema or of erythema with vesiculation. It is important to remember when applying these tests that certain eczematogenous substances such as lime, turpentine, formalin and some others are normally somewhat liable to irritate the skin, and they should be applied either in high dilution or for very short periods. On the other hand, such substances as flour, sugar, flowers and teak sawdust, which have normally no irritant properties, should be applied for twenty-four hours.

*Internal causes*—Of these certain drugs, notably quinine, the salvarsan derivatives and gold compounds are well-known examples. Certain types of foodstuff, especially those which may cause urticaria, occasionally give rise to eczema. In infancy cow's milk is an

occasional though rare cause of eczema

Probably the most important blood-borne irritant in eczema is a substance of autolytic origin derived by a process described by Whitfield as auto-sensitization from a lesion in the skin itself. Whitfield observed this process first in the case of a man with acute vesicular eczema of the legs, whose serum in trickling over the healthy skin produced a row of eczematous vesicles. He further expressed the opinion that the very common class of case in which a generalized eruption followed the rubbing of a single chronic patch of eczema, such as varicose eczema, was analogous, in these, new patches first appear in the neighbourhood of the original patch, then a generalized patchy erythema, becoming eventually a scattered papulovesicular eczema. He considered that both conditions were due to the absorption of the patient's own broken-down tissue products. Whitfield attributes the extreme chronicity of many cases of eczema to auto-sensitization. (*See also* p. 219).

#### PATHOGENESIS

That sensitivity in eczema resides in the epidermis was first demonstrated by Bloch and Peter, who grafted the skin of a subject sensitive to iodoform on to a normal subject. They found that the graft remained sensitive to iodoform whether this substance were applied directly or taken internally, while the rest of the skin remained insensitive. Bloch regards eczema as essentially an allergic process. According to his conception, allergy is based on the property of certain cells or organs of the organisms to react in a specific manner when brought in contact with a substance which as far as is known is foreign to it. The specific pathological process which results from this contact is the result of the reaction of the substance with its antibodies fixed in the cells. This conception brings eczema into the line with anaphylaxis, urticaria,

asthma, and hay fever, and with the majority of microbic and mycotic infections. Unfortunately, while in the majority of these conditions the presence of antibodies has been demonstrated in the blood stream, and while in the case of anaphylaxis and urticaria it is possible to transmit passive sensitivity to a normal subject, it has so far proved impossible to demonstrate the existence of antibodies or to transmit passive sensitivity in the case of eczema. Bloch explains the absence of demonstrable antibodies in eczema by supposing that while in urticaria there is always an overflow of antibody into the general circulation, in eczema the antigen is all fixed in the epidermal cells.

*The eczema-asthma complex and the idiosyncratic eczemas*—By their close relationship to asthma, hay fever and urticaria, these must be regarded as allergic reactions of the epidermis to one or a number of irritant substances. By sensitizing normal subjects to primula obconica, and subsequently producing eczema in them by simple application of this plant to the skin, Bloch has succeeded in establishing the identity of idiosyncratic and acquired sensitivity.

*Occupational eczema*—Oppenheim believes, on the other hand, that allergy is the basis of eczema in rare instances only. He has drawn attention to the fact that water which has no antigenic properties is the most important cause of professional eczema. The constant damage over long periods to the protective horny layer of the skin in all wet occupations eventually leads to the breakdown of the resistance of the skin to all kinds of irritant substances.

*Eczema due to physical causes*—It would appear equally difficult to accept allergy as the basis of eczema excited by a purely physical stimulus such as sunlight; in such cases, however, the skin may in reality be sensitive not to light, but to an antigen in the blood stream, which only requires the slight mechanical stimulus of sunlight to bring about an intense reaction.



between it and the sensitized epidermal cells. In such cases one or more patches of eczema are often found elsewhere on the body, and, in these, sensitivity to climatic stimuli is in reality an expression of the process already described as auto-sensitization. In the absence of a focus on the skin itself the existence of an antigen in the circulation may be assumed in many cases on the grounds of probability.

*Microbic and mycotic eczemas*—It is doubtful whether pyogenic organisms ever give rise to eczema in the first place, but the primary lesions normally caused by them such as impetigo, ulcers, fissures, boils and pustules are frequently complicated by eczema, which occurs first in the immediate neighbourhood of the septic lesions and often later at a distance from them. It is not certain whether the eczema results from auto-sensitization or from sensitivity to the toxins of the organisms.

In mycotic infections the eczematous reaction is probably due directly to the organism and its toxins. Ringworm infection, especially epidermophytosis of the feet, is the principal example of this type, owing to the absorption of the endotoxin of the fungus the primary infection is often complicated by eczematous lesions at a distance, especially by dysidrosiform eczema of the hands. The existence of sensitivity to the infection may be demonstrated by the intradermal injection of trichophytin as a cutaneous test.

In seborrhœic eczema the primary papule or group of papules appears to be the result of direct infection of the skin with the spore of *Malassez*. The condition is often complicated by diffuse scaly, weeping or crusted eczema, particularly of the scalp, post-auricular folds and the intertriginous folds generally. In these cases the eczema is probably due to auto-sensitization and not to allergic sensitivity to the spore of *Malassez*. It is difficult to account for the predilection for the folds in these and in cases of infective origin in general, and

their precise pathogenesis remains undetermined.

It would appear reasonable to accept allergy as the basis of the majority of eczemas if the term be held to imply, as its originator von Pirquet intended, simply altered or exalted reaction. But it is not yet possible to assume the presence in the epidermal cells of fixed antibody to the irritant to which the epidermis is sensitive, or, as A. M. H. Gray points out, to claim in the absence of any definite knowledge of the chemical and physical changes which take place in the cells in eczema that we have reached bed rock. Darier regards all eczematous processes as a manifestation of epidermal intolerance, and sensitivity as intolerance regarded from a particular angle. Allergy he believes to be probably one of the mechanisms by which intolerance may be manifested, but it is not necessarily the only mechanism.

#### TREATMENT

In practice, it is advisable to consider eczema from the three separate angles that have been briefly discussed. In many cases the chief causal factors may be determined without difficulty by inquiry and by direct observation, as for example in many eczemas of external origin. In these the diagnosis may be confirmed by applying patch tests, and the essential part of treatment is the avoidance of the offending article, combined with suitable local treatment.

In others predisposition to eczema is so important that it may be practically impossible to avoid the various substances which determine an attack. This group includes those cases of occupational origin in which the resistance of the skin, often impaired by hyperidrosis, has been gradually broken down by prolonged exposure to an irritant, or by constant scratching, cases of the eczema-asthma group; many cases of infective origin, notably chronic impetiginous eczema of the scalp in children, varicose eczema and

eczema of the vulva and perianal regions In almost all varieties of chronic eczema in fact, predisposition may have become too firmly established to eradicate by any means known to us at present Between these extremes there are many intermediate types, and in these there is often a number of predisposing and exciting factors the relative importance of which may be assessed and a rational therapy devised only after very careful consideration

*Local treatment general principles*—Treatment must be elastic, varying according to the stage of the disease In the acute erythematous and vesicular stages, in order to facilitate evaporation and drainage of serum and to cool an inflamed surface, it is advisable to use simple watery lotions or watery pastes or occasionally oily liniments containing no antiseptic Calamine lotion, lead lotion, or calamine liniment may be used for this purpose, or the following watery paste.—

R. Glycerin	-	-	-	-	-	-	-
Liquid paraffin	-	-	-	-	-	aa	1 part
Zinc oxide	-	-	-	-	-	-	-
Starch	-	-	-	-	-	aa	5 parts
Water	-	-	-	-	-	-	12 parts

to be applied two or three times daily, soaking off with lead lotion before re-applying

In impetiginous and crusted eczemas accumulated crusts must be removed; this is often best accomplished by liquid paraffin or olive oil, though occasionally it may be advisable to soak off impetiginous crusts with a weak antiseptic, e.g. solution of potassium permanganate  $\frac{1}{1000}$ , or starch and boric poultices, before applying any other remedy.

In the natural course of events the weeping stage of eczema is succeeded by a desquamative stage (parakeratosis) Desquamation results from the desiccating action of air on superficial imperfectly keratinized epidermal cells Its presence generally indicates a healing stage and protective creams and pastes, which formerly were badly tolerated, are now indicated.

They replace in part the fat which in the parakeratotic phase is lacking in the superficial epidermal cells. When, as the result of repeated scratching, lichenified and indolent infiltrated patches of eczema are produced, it is usually advisable to add one of the reducing agents such as ichthyol, tar or lenigallol in varying proportions to a paste or cream, for example .—

R	Ichthyol	.	.	.	.	.	.	℥	v
	or								
	Liq pic carb	.	.	.	.	.	.	℥	xl
	Starch	.	.	.	.	.	.		
	Zinc oxide	.	.	.	.	.	aa	5	ss
	Soft paraffin	.	.	.	.	.	to	5	i
	or								
R	Ichthyol	.	.	.	.	.	.	℥	ij-v
	Zinc cream, B P C	.	.	.	.	.	to	5	i

To such patches X-rays applied in fractional doses are often of the greatest value

#### LOCAL TREATMENT OF SPECIAL VARIETIES

*Infantile eczema*—The crude tar paste advised by C. J. White has proved of the greatest value in infantile eczema. Its formula is as follows .—

R	Crude coal tar	.	.	.	.	.	.	2	parts
	Zinc oxide	.	.	.	.	.	.	2	parts
	Starch	.	.	.	.	.	.	16	parts
	Paraffin	.	.	.	.	.	.	16	parts

The tar and zinc oxide must be thoroughly mixed and then incorporated with the starch and soft paraffin, also intimately mixed. The resultant preparation should be almost black. The paste should be applied to the affected parts twice daily, or in very restless cases once in 24 hours; it must be gently removed with olive oil before re-application. The only objection to this preparation is that, like all crude tar preparations, it sometimes gives rise to follicular pustulation.

To overcome this difficulty a distillation product of tar, obtained by passing steam through tar and extracting the distillate with ether, has been used; after the ether has been allowed to evaporate, a viscid semi-solid preparation is left. This has proved

a satisfactory substitute for crude tar and its use is never followed by pustulation

Whatever preparation be used for the local treatment of infantile eczema it is essential that the child should be kept completely at rest, the arms and, if necessary, the legs should be splinted, under these conditions the eczema generally improves with surprising rapidity

*Chronic eczema of the scalp in children* — This variety of eczema is almost always of infective origin, and is generally associated with post-auricular fissures and eczema, and chronic blepharitis. The local treatment is difficult. In the presence of weeping and crusting it is best to begin by cutting the hair and applying purely soothing lotions, such as lead lotion, until the acute phase has passed. In the succeeding dry desquamative phase one of the tar preparations that have been mentioned in connection with infantile eczema may be used. Small doses of X-rays are of great value in the treatment of this variety of eczema, but a full erythema dose may aggravate the eczema and may be followed by cicatricial alopecia.

Post-auricular fissures may be painted with 1 per cent solution of nitrate of silver in spirits of nitrous ether or 1 per cent protargol, or with the aniline dyes malachite or brilliant green 1 per cent in 25 per cent spirit. If chronic otitis media be present the eczema will not, as a rule, improve until this condition has been cured by operation.

For chronic dry seborrhœic eczema of the scalp the following preparation may be found useful —

R.	Oil of cade	-	-	-	-	-	℥	xxx
	Sulphur	-	-	-	-	-	grs	xv
	Salicylic acid	-	-	-	-	-	grs	x
	Soft paraffin	-	-	-	-	-	ʒ	ij
	Cocoa-nut oil	-	-	-	-	to	ʒ	i

The scalp should be treated with this at night and shampooed every few days

For the dry figured variety of seborrhœic eczema of

the chest and back, sulphur is the best remedy :

R	Sulphur . . . . .	grs xxx-xlv
	Knolm . . . . .	grs vi
	Zinc oxide . . . . .	grs x
	Benzotated lard . . . . .	to ʒi

For the more acute varieties of seborrhœic eczema and for cases in which weeping and impetiginous crusting are present, the principles outlined for the local treatment of eczema in general should be followed.

For lichenified eczema of the flexures, White's crude tar paste and fractional X-ray exposures are the best local treatments. In varicose eczema and chronic infective eczema of the legs the patient should be kept at rest to begin with and treated with local protective remedies until a quiescent dry desquamative phase is reached; an Unna's paste bandage may then be applied and changed about once a week. Varicose veins should not be treated until the eczema has almost or completely disappeared.

*Intertriginous eczema of non-mycotic origin.*—The treatment of eczema of the intertriginous folds is often difficult and unsatisfactory because it may be impossible to alter conditions such as obesity and hyperidrosis, which favour its development. Watery pastes, starch powder and water lotions are found useful in the acute phase, while later zinc oxide paste or a mild tar paste may be employed. X-rays may be applied in small doses with great advantage in very chronic cases.

#### GENERAL TREATMENT

Rest, mental and physical, is of paramount importance in the treatment of eczema. Sleep should be ensured if necessary by the use of drugs. The diet may be mixed but should be simple and moderate in quantity. Stimulants are best avoided, and pepper, mustard, chutney, curries and highly spiced food of any kind should be forbidden. In the cases belonging to the eczema-asthma group, as well as in those suffering from intestinal stasis and toxæmia, a lacto-vegetarian

and carbohydrate diet is of undoubted value. In infantile eczema fats are generally badly tolerated and improvement may follow dilution as well as diminution in quantity of the milk feeds. In the rare cases of sensitivity to cow's milk the synthesized milk, Almata, has proved a valuable substitute. In cases in which an idiosyncratic sensitivity to special foods is known to be present, these and similar foods must be strictly avoided.

In weeping generalized eczema in plethoric subjects the Guelpa treatment may be given for a few days. In this the patient is given no food but allowed fluid in abundance, while sodium and magnesium sulphate are administered in sufficiently large doses to ensure copious fluid evacuations. The object of this treatment is to promote dehydration of the cedematous skin. Irrigation of the lower bowel is of value in selected cases. Heliotherapy is of great value in eczemas of microbic origin, especially in children, as well as in the eczema-asthma group, but the results of artificial light therapy have proved disappointing. Though good results have been claimed from the use of a variety of internal remedies, drugs have so far not proved a great success in the treatment of eczema. Non-specific protein therapy has also on the whole proved disappointing, although an occasional dramatic success is achieved with auto-hæmotherapy. Eczema is always aggravated by nervous instability and worry, and psychological treatment is often of the greatest importance.

# Ringworm of the Scalp

By W J O'DONOVAN, OBE, MD, MRCP, MP

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THE modern recognition and treatment of ringworm is governed by two factors that did not complicate the clinical problem in the pre-war years. Ringworm is a diminishing disease, as is shown by the following figures of the new cases at the London Hospital :—

1927	-	-	-	196
1928	-	-	-	160
1929	-	-	-	142
1930	-	-	-	124
1931	-	-	-	99

Associated with this has been the official tendency to aggregate the treatment of ringworm into a few highly-skilled centres. This means that ringworm cases present themselves rarely before the practitioner, and hence there is happening here, as in the case of syphilis, diphtheria, and other segregated diseases, a divorce of this condition from the everyday thoughts of the practitioner.

X-ray epilation, and medicinal epilation by the internal administration of thallium acetate, are both comparatively modern and certainly are forms of treatment that involve a measure of risk. Since every ringworm case in school children happens to be under the supervision of school nurses, school doctors and public health authorities, there seems to be on the part of practitioners a reluctance to undertake a treatment which may be criticized and must be reviewed by these many interested onlookers.

The early recognition of ringworm is the chief method by which the propagation of this unpleasant malady can be checked. It is a great reproach to the hair-



dressers' calling that, although they have handled human heads day by day for centuries, it is the rarest possible event for a case of ringworm to be sent to a physician by a hairdresser. Had they been competent and authoritative in this elementary observation, school nurses would not be compelled to make an anxious search of thousands of heads after every prolonged holiday period. Experience has amply demonstrated that this affection is spread easily and rapidly by the interchange of hats and by the common use of brushes and combs. The pressure of the head against an infected barber's coat has before now infected a preparatory school in which separate brushes and instruments were used for each head.

Subjective symptoms, such as itching or discomfort of the scalp, are rarely felt. In the earliest stages ringworm appears as a small area of pseudo-baldness with a fairly definite outline, having a white or grey scaly surface from which project four or five short hairs broken off about a millimetre from the surface of the scalp. Generally the number of scalp lesions are multiple, two or three lesions being quite common if searched for. Later the disease may develop in several ways. In the thin, delicate scalp of very young children numerous red cyclic lesions may be recognized, an inch to 4 inches in diameter, having a raised, rounded surface covered by adherent greyish scales causing little or no loss of hair and responding easily to treatment with anti-parasitic ointments. In children of three years or over there may develop several nummular discs of closely-applied, small, overlapping scales, with a glistening whitish surface. These discs may vary in size from 1 to 3 cm, and the baldness of these patches may be striking and apparent. Small stumps hardly project above the surface of the scales. The underlying skin is sometimes definitely pink, is never moist, and sometimes shows no colour change. Often the affected area is broad, showing a sheet of dirty,

greyish scaling in which are many stumps and profuse long hairs, which mask the condition to some extent.

At any examination of a suspected case of ringworm it is highly advisable that every young member of the same family should have his head thoroughly inspected. Moreover, it is common for most helpful material to be furnished by an examination of the patient's neck and trunk. Secondary satellite circular discs of growths of ringworm on these areas are as confirmatory of the diagnosis of a suspected patch of pseudo-alopecia of the scalp as is the production of a growth of mould in a culture tube. The physician's work is made difficult if the scalp has been stained by the application of ink or of iodine or of patent ointments; whilst diagnosis is greatly facilitated if the hair be clipped all over uniformly close to the scalp. At times both boarding-schools and orphanages will need the close attention of a practitioner. Cases may suddenly crop up in epidemic numbers owing to the inadvertent admission of an infected head. The children may be too crowded. Their clothing not in use may be too closely packed together, with the risk of infection by scales spreading from the neck of one overcoat to another. Brushes and combs may not have exclusive ownership, weekly cleaning of these may be overlooked. The washing of the children's heads may be irregular and infrequent. The same towels may be used for two or more heads in succession. It is important that new admissions and children returning from holidays should arrive with their hair short, otherwise an infection of the scalp may remain hidden and become disseminated for some time without the knowledge of the authorities. If the reason for this is given, I feel sure that most parents would gladly co-operate. The risk of an epidemic of ringworm is too great to be balanced against an individual mother's preference for a long-haired boy or a long-haired girl. An outbreak of ringworm on the girls' side is always most deplorable. As

a measure of prevention I have no desire to lay any stress upon sterilization of blankets or mattresses; they are sufficiently protected by sheets, which are boiled. Exposed woollen clothing can be sufficiently sterilized by rubbing the necks of overcoats with a rag soaked in methylated spirit and afterwards baking. The procedure of burning the hair brushes of infected children is right.

The school barber will need a word of advice.<sup>1</sup> He should wear a different overall for each separate batch of children, which should be boiled after use. He should have two pairs of clippers, and when one is being used, the other should be kept in a bowl of white surgical spirit. Lysol solutions are ineffective once the instrument is made greasy by its contact with the scalp. In the same way there should be for so many heads at least three pairs of scissors and three combs in use. These, too, should be in a bowl of spirit; never in the pocket of his overall, which becomes after a short space of time a pocket of infection. The room in which the hair is cut should have a supply of soap and water so that he can easily wash after touching any suspicious scalp. It is important for prevention that a separate towel should be used for the neck of each child while the hair is being cut. The last item is that the use of a soft common brush for removing hairs from the neck should be omitted.

X-ray epilation still maintains its position as the primary therapy. X-rays do not kill ringworm spores, but they produce epilation in twenty-one days, and complete epilation is the essential for successful treatment. Ill-effects have been recorded from the earliest days. Eczema, dystrophy, and cancer of the operator's fingers are now guarded against. Penetrating ulcers of the assistant's hands used to hold the child's head in position and wrist-drop have been carefully noted and recorded. Large areas of permanent alopecia of the scalp are still produced by errors of technique, or

perhaps by some inexplicable and rare susceptibility, in small treatment centres. In the London Hospital skin department between September 1, 1905, and December 31, 1931, 8,335 cases of ringworm of the scalp have been treated without—so far as we know—any permanent ill-effects. This is due to the great care taken by J. H. Sequeira,<sup>2</sup> my predecessor, in establishing and formulating a sound technique, and to the care the operators have since taken never to depart from the lines laid down by him. The epilation dose is four-fifths of a Sabouraud pastille. Gas-tubes have always been used and are in use now. Children are not treated below the age of 4. Artificial restraint is never necessary, but once a year a refractory child needs a small dose of chloral. S. C. Shanks's<sup>3</sup> report of 2,400 cases treated by X-rays is equally satisfactory.

As anyone who wishes to undertake this work must study in a clinic where the work is traditional and well-established, no purpose would be served by any full account of the details observed; but, at the London Hospital, as at all teaching hospitals, special students are welcome visitors.

No account of treatment would be complete without a full reference to epilation by thallium acetate. It was rejected by Sabouraud as dangerous in the early part of this century. In England we owe its introduction to G. B. Dowling,<sup>4</sup> in 1927, and he has been ably supported both by J. E. M. Wigley and by J. T. Ingram,<sup>5</sup> whose procedure I know to be perfectly safe and simple. His practice is to weigh the child naked. The weight in pounds is multiplied by four, which gives the required dose of thallium acetate in milligrams. This method appears to me simpler and safer than the usual practice of weighing in kilograms and varying the dose per kilogram as between eight and nine milligrams of thallium acetate dissolved in a draught of sweetened water.

If the dose be under 200 mg., the administration is

followed by ordinary out-patient supervision. If the dose is between 200 and 250 mg, the very cautious will treat the case in bed, but it is satisfactory to proceed without anxiety, as long as the child is kept under observation. Between 250 and 300 mg great watchfulness must be exercised, and the case be treated in bed. A larger dose than 300 mg should never be given. The average age of a child requiring 200 mg is 7 years, 250 mg, 9 years, 300 mg, 12 years. It will be seen that there is little danger in treating children up to the age of 9 years. Epilation and re-growth occur in three weeks.

When such precautions are taken it is impossible for a child to receive anything dangerous in the way of an overdose, even although slight errors are made in the calculations or the scales prove inaccurate. Ingram stresses, and I agree, that it is unwise to use stock solutions of the drug, since this practice may lead to errors in dispensing. Tablets of varying strength may be obtained in different colours, so that there is little or no excuse for dispensing errors with this dangerous drug. "In most cases the tablets are swallowed by the child, who is subsequently given a drink of water. There is less chance of the child not receiving the full dose if this practice is followed." There is, however, considerable room for further improvement in the wholesale dispensing. Should epilation be unsuccessful, he does not consider it wise to repeat a dose of thallium by the mouth without an interval of not less than three months. In using thallium acetate the scalp should be washed night and morning with soap and water, and apply a very thin film of ung. hyd. ammon. dil. daily to the cropped head to prevent the dissemination of any scales. Ingram paints the whole scalp three times a day with 2 per cent. tincture of iodine every day from the onset of treatment. If iodine is used no ointments nor fomentations should be applied as well, as painful suppurative dermatitis medicamentosa would easily

develop.

No evidence has been yet recorded that suggests that treatment by thallium will do permanent damage to any organ. This idea may be dismissed. Deaths from thallium poisoning have occurred, from mathematical miscalculations, from inaccurate scales or from continued partial dosage day by day. There is no conclusive evidence that danger is to be expected apart from avoidable errors in technique of this nature. In thallium acetate we have a measure of safe therapy that brings the treatment of small-spore ringworm within the powers of every medical practitioner. It is the rule for perfect recovery to be made in a case of ordinary ringworm of the scalp. Reinfection by old toilet articles, or by an untreated case in the family, is always possible, but such cases are rare.

A special clinical type of ringworm of the scalp traditionally called *kerion Celsi* is produced by a virulent infection of the hair which provokes a very strong local and sometimes general reaction. Such cases present a domed red swelling, on which the hairs are not broken off, but can be withdrawn with the greatest ease from the follicles in the boggy, inflamed zone.

Not infrequently these well-defined and sometimes painful domes of reaction are incised by junior surgeons, but there is an exudation of clear and sanguineous fluid without the demonstration of any pus. It is common in this last condition for the hair roots to be destroyed by the intensity of the inflammation and for a permanent small scar to remain at the site of the disease.

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# Seborrhœa

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SEBORRHŒA is a cutaneous condition characterized by faulty secretion of sebum and sweat, and occurs at certain periods of life, often unfortunately persisting in the intervals, and affecting areas of the body rich in sebaceous and sudoriparous glands—particularly the scalp, face, front and back of the trunk, especially the chest and the flexures. A good many years ago I defined the condition as the “dyspepsia of the skin,” and, as affecting the glands, it is a more suitable name for this disease than for eczema, a recent American suggestion.

The polymorphic character of the eruption, though familiar to most, may be recalled here. On the scalp it appears as dry scaling, more or less severe at times, even to the extent of forming sheaths of scales up the hairs. When more acutely inflamed, generalized swelling, well-marked redness, oozing, exudation, and the formation of crusts with sometimes loss of hair occur. There is a rarer type in which there is excess of secretion and the scalp is primarily very moist and greasy. The auricles show scaling and redness, usually first near the external auditory meatus or at the retro-auricular fold. Generalized swelling, oozing and crusting may supervene later. The face is mostly attacked in the hairy regions near the orifices or at the fringe of the scalp. On the front and back of the chest generally it appears as irregular areas, slightly red or yellow, with more or less scaling at the edges or over the surface of the affected area.

Other forms are seen, the most common being the papular, and the less common, diffuse erythema with slight scaling. On the flexures where more sweat glands normally occur and redness with a certain

amount of scaling is the first manifestation, there is generally a greater amount of moisture and subsequent swelling, and of crusting in the more severe types. In this category come the napkin rash, seen on the buttocks and groins in infants, and the firing under the pendulous folds of the stout, full-breasted woman.

The constitution of sebum and sweat has been frequently a subject of research. Pachur<sup>1</sup> states that the sebum consists of 88.6 per cent neutral fat, 7.54 per cent. cholesterol, and 4.2 per cent of cholesterol-esters, soaps and phosphates. Sweat also is said to contain cholesterol with alkaline salts. Confirming clinical experience, Pachur finds an increase of sebum at puberty and decrease in old age. He also notes an increase when the subject suffers from seborrhœa, acne or folliculitis. It has long been recognized that the consistency and the amount of both secretions vary in disease.

Whatever the full biochemical changes, it is evident that they render the secretions more suitable culture media for numerous organisms. It is not surprising therefore that the disease has been attributed to the organisms found in these lesions. McLeod and Dowling<sup>2</sup> have recently done excellent work in proving the presence of monilia in the scaly type; Sabouraud<sup>3</sup> insisted on streptococci as a factor in the inter-triginous type, and other observers have found different organisms. All credit should accrue to these workers, and no doubt need be felt as to the truth of their observations so far as they go, but I am convinced that it is only one aspect of the truth, and even some of them agree that there is a constitutional change also responsible.

Well-marked cases show the seborrhœic type of individual, generally debilitated and suffering from periodic eruptions on the scalp, eyebrows, eyelashes, beard region and flexures, a condition that no mere local infection would account for. Reasoning from



this, it is always advisable to consider even in mild cases that there is an underlying diathesis. Some general disease or metabolic error may lower the individual and increase the skin sensitivity. Still more frequently a local infection or irritation is the cause of an outbreak which spreads far beyond the original site. Some will recall cases of boils, trade dermatitis, and the local irritation of an embrocation followed by such a sequel.

The following possible factors may first be discussed civilization, diet, acidosis, and endocrine disturbances. *Civilization*, with the compulsory use of clothing, with the growth of cities and the resultant smoke and dirt, has often been regarded as the cause of the outbreak and spread in the susceptible individual. Irritating soaps are used to remove the dirt and dust. Take the experience of the baby in a working-class home, where all may live in a common room and the crib is frequently placed beside the often-stoked kitchen fire. Is it to be wondered at that, with the changes of temperature, dirt and dust, a seborrhœic dermatitis is apt to appear on the face and scalp? The active little head and hands soon disturb the sheets and come in contact with the flannel of the blankets; the contact is followed by severe itching and rubbing, and the sequel is the all too common type involving the face, scalp, neck and hands. The flannel rash of the young adult is well known and occurs especially after perspiring and the wearing of new, unwashed flannels.

*Diet* may also come under the heading of civilization, and it has been a subject of much separate research. Some workers have laid stress on the evils of too much carbohydrates in the diet, and others on too much fat. American writers aver that valuable information can be obtained by examination of the stools of the affected infants. In my personal experience no great benefit has been obtained by such examination. Clinically, however, it should be noted that the moist exudative

types are certainly often improved by the reduction of the carbohydrates, and of these sugars and sweets are undoubtedly the worst. In the infant it often comes on after an early weaning, say, of three months. This must not, however, be confused with the type so frequently arising on the face and cheeks in the first few weeks after birth. I have certainly traced it after weaning to some of the proprietary foods rich in sugars. Here is a case for thought. A baby had an intussusception necessitating an operation and removal of some feet of the bowel, thereafter diarrhoea followed, and the eruption spread from the nates all over the body. What metabolic changes occurred to produce this? On the other hand, it is very significant that many cases discharged from hospital apparently cured, relapse soon after, even though the diet has not been altered. Further, cases have been admitted into hospital in which no fault could be attributed to the diet, and these have cleared up in hospital and then relapsed after discharge. In some of these the histories no doubt may not have been accurate and such errors as feeding between meals indulged in, but this is based on the experience of hundreds of patients with intelligent parents only too anxious to keep the children well.

The question of *acidosis* was brought to the front some years ago, and cases recorded in which large doses of alkalis were followed by improvement. Ingram reports 26 cases of seborrhoea, and in these no evidences of acidosis could be found. I have treated a large number of cases on these lines, and even in the case of in-patients have pushed the alkali until the urine was strongly alkaline without the slightest benefit either to the patient or the seborrhoeic manifestations. Nevertheless, in quite a number of old people, even without glycosuria, a full administration of alkalis allayed the itching and improved the local condition. Theoretically with a heightened  $p^H$  value

of the serum an alteration in the secretion of the sebum and sweat would be expected.

*Endocrine disturbances.*—It is well recognized that seborrhœa, while occurring at all periods of life, is apt to break out when there are evolutionary and devolutionary changes in the glands of the skin. The vernix caseosa of birth is not pathological, is purely protective, but is sometimes excessive. Infantile dermatitis may be seen, even within the first week, originating on the cheeks or the scalp, or may appear some months later. At puberty seborrhœa of the body and scalp, acne and rosacea may serve as examples. At the menopause rosacea and infections of the flexures are very common, while in old age we have the dry skin following the imperfect oiling and moisture and the resultant susceptibility to irritants. Exfoliative dermatitis is a frequent sequel. The following may serve to illustrate the above.

A lady near the menopause went to the hairdresser for a shampoo, and thereafter developed a seborrhœic dermatitis spreading from the scalp and ultimately involving all the flexures. It seems quite certain that the skin at that period was unduly sensitive, and that a seborrhœic dermatitis having commenced in one area readily spread to other areas commonly affected in seborrhœa. It must, however, be remembered that endocrine disturbances may also be the direct result of gastro-intestinal poisoning.

That the pituitary, thyroid, and adrenals, and possibly some other glands, have an influence on the skin is scientifically established. Empirically the administration of thyroid is often of value, and infants occasionally show a curious combination of a mild xeroderma with seborrhœa. The pituitary has a controlling influence on the gonads, and as in these latter glands disturbances are more common at the crucial periods of life, then the pituitary may be a controlling factor there also, but this problem cannot

be elaborated until the individual activities and the inter-relations of these and other glands are more scientifically explained.

In extensive cases, however, in which relapses occur and involve the scalp and the flexures there would appear to be some other factor; for instance, a young woman, whom I have treated since she was two or three years of age, still has relapses of the disease, and is incapacitated for any outside work. It cannot be explained on dietetic grounds, from the point of view of environment, or even as a monilia infection, but it may be compatible with disturbance of a hormone in the skin.

The diagnosis of these conditions in the chronic stage is easy. In the early stage affecting the trunk, ringworm and even syphilis may have to be eliminated. Affecting the flexures, other fungoid infections may also have to be considered. The later developments of seborrhœa may be either recurrences of moist eruptions on the flexures or papular eruptions on the limbs or trunk with periodically fibrosis and lichenification in certain areas that have been itchy and scratched.

#### TREATMENT

Before discussing treatment it is as well to revert to the statement that seborrhœa underlies many other skin conditions. Epidermophytosis has been mentioned, and I am quite sure that the seborrhœic skin is one which is very liable to infection by fungi. Where a typical clinical picture of dhobi's itch is seen in the groins, a history will often be obtained of a seborrhœa having occurred before, or it may occur later; indeed, all the flexures may be involved. On occasions one has seen seborrhœic dermatitis of the body in which the lower limbs became infected by epidermophytosis spreading upwards from the toes, and this last responded readily to Whitfield's salicylic and benzoic

ointment. Such a simple condition as impetigo of the face will at times be difficult to treat in a child owing to the underlying seborrhœa, and in the adult it may develop into a well-marked sycosis. Many other illustrations might be given, but these must suffice.

With such a picture in view, it is small wonder that the general practitioner abhors dermatology, but there is a bright side. The seborrhœic dermatitis of infancy, trying to the doctor, and still more so to the parents or nurse on account of the restless nights and the continual dressings, yields in the vast majority of cases, and that even when hope is almost expiring. A child whom I treated ten years ago for involvement of the whole body was seen recently with a skin which has remained normal for the last nine years. Similarly, the manifestations at puberty in the form of seborrhœa corporis or acne are generally amenable to treatment, if it is thoroughly carried out.

It can be gathered from what has been said that each case must be individualized, and also that it is almost impossible to describe all the varieties. The treatment must be general as well as local. Though various internal methods have been suggested, it is desirable to insist that amidst all the welter of theories, the fact stands out that a healthy gastro-intestinal tract and attention to the teeth and general health are of paramount importance. Quite recently an obstinate seborrhœic sycosis, which had been X-rayed and treated in all sorts of ways by other dermatologists, yielded at once to gastro-intestinal treatment and has remained cured. Septic teeth and pyorrhœa may not cause any apparent indigestion, but, as I have remarked elsewhere, a digestion that is capable of absorbing pus without suffering itself, may allow the circulation of the poisons arising therefrom more readily than a more sensitive stomach which resents the presence of pus. It should therefore be a constant

rule to overhaul the teeth

In chronic cases the use of peptone intramuscularly or intravenously is of great value. In acute cases, staphylococcal vaccines are useful. Space will not allow details, but their employment should not be overlooked.

*General treatment*—In extensive cases baths are necessary, soothing if acute by means of weak permanganate of potash, bran or starch, more stimulating by weak alkalis, potash carb or sulphur in the chronic cases. As ointments are expensive, it is advisable to use lotions if possible. Generally speaking, sulphur in lotion, ointment or paste takes precedence. Thus, in extensive cases I very often prescribe lead and zinc, or ichthyol- or sulpho-calamine lotion, according to the character of the lesions, using the first when very moist, the second when only erythematous, and the third in more long-standing cases. The lotions, however, are drying, and it is a good plan to prescribe along with them a paste for application over the worst areas. The pastes, made up in bases of equal parts of zinc oxide, starch, lanoline and vaseline may have added to them 1 per cent of ammoniated mercury if the condition is very infected, 1 or 2 per cent of ichthyol if it is simply erythematous and very moist,  $\frac{1}{2}$  to 2 per cent of sulphur with, if necessary,  $\frac{1}{2}$  to 2 per cent of salicylic in the thickened, scaly type. At a later stage 1 or 2 per cent of crude tar in paste is generally our most active anti-pruritic, and resolvent of fibrosis.

In the flexures and behind the ears, when there is much moisture, a 1 per cent. of silver nitrate solution applied daily is one of the best astringents. Where colour is not objectionable, again in the moist areas,  $\frac{1}{4}$  to  $\frac{1}{2}$  per cent crystal violet or gentian violet in spirit will be found to exercise a good astringent as well as antiseptic effect.

Where the scalp is involved, the routine plan is to

Rather proudly she said that she had never missed bacon for breakfast since. Remembering the former patient, I stopped all pig-fat and for the first time she began to improve and ceased to develop new lesions. She eventually made a complete recovery.

Since then I have been on the lookout for similar cases of persons sensitive to pig-fat, and have been rewarded more abundantly than I anticipated.

One of these cases happened to occur in a member of my own family, so that it was easy to test it thoroughly. This lad was very sensitive to pig-fat of any kind, whether as bacon, sausage, lard, or in any other form. After the removal of pig-fat from his dietary, he remained free from lesions, but the smallest trace of pig at any time produced spots at once. On one occasion after being free from spots for months, he had a breakfast meal with bacon and after 24 hours he had the worst crop of acne pustules that he had ever had. Treatment was powerless to prevent the evolution of fresh lesions until 14 days had passed, when the process ceased and no new spots developed. On one occasion he developed pustules and papules after fried eggs, and I thought that he might have developed a sensitivity to eggs, but I found that these eggs had been cooked in bacon fat, and that he could take eggs cooked in any other fat with impunity.

This observation is of peculiar interest for three reasons. First, because of the length of time the single meal was capable of producing lesions—namely, fourteen days. Secondly, the fact that no treatment which I used during this fortnight prevented in any way the lesions from evolving, or even in mitigating the severity of the outbreak. Thirdly, the small amount of the offending pig-fat which proved sufficient to produce spots, namely, just that amount which adhered to the eggs after frying in bacon fat.

With this experience I have set my patients with acne, especially pustular forms, and those whose spots come out in crops with intervals of freedom, to keep diet charts, and I have found as many as 25 per cent. of my cases who have shown some relation to pig-fat as either the exciting cause or as a contributing factor. There were among them, of course, many cases which showed no relationship to pig-fat in any form, but there are many cases where I have had no reports, and it is therefore possible that the 25 per cent. may be too small a proportion. I have met, however, with cases where other foods were or seemed to be the cause of the lesions.

In one case, that of a girl aged 14, I believe the acne was largely determined by large ingestion of chocolate, for she admitted that a day was ill spent if she did not eat half-a-pound of chocolates. This

large excess of sugar may readily produce the accompanying seborrhoea, and would certainly be liable to make an existing acne worse.

If food of any kind is a contributory cause of acne, only stopping this article of diet will relieve the patient, unless the follicles are completely dried up by means of X-rays. No lotions, pills, vaccines, or kindred treatments can be expected to arrest the process. But if the offending article of diet is determined, the omission of this will be all that is necessary in the majority of cases. In some it may be found that a few spots continue to evolve, but then treatment will be found to have an effect which it did not produce before. This is distinctly not a question of indigestion. These persons can take pig-fat and enjoy it without the slightest sign that it does not suit them. It is undoubtedly the excretion of a fat through the skin, which is capable of irritating the follicular wall directly, or what is more probable, of giving the organisms in the follicles a food from which they make irritant toxins. It is quite possible that these fats are of a different melting point from the ordinary sebaceous oil, that they remain as fatty plugs in the follicles, and as they are not extruded, the products of germ growth do not escape and so act upon the walls of the follicles.<sup>2</sup>

I therefore suggest that:—(1) There are not infrequent cases of acne vulgaris and pustulata, which are dependent upon dietary factors for their onset. (2) Only the stopping of the offending foodstuff will result in the cure of the patient, or at least in permitting treatment to be effective. (3) Very small quantities of the offending diet are sufficient to cause eruptions in very sensitive cases. (4) The eruption of lesions may continue for a week or longer from one meal of the deleterious substance. This fact probably explains why the connection between diet and acne has not been observed more frequently.

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# Impetigo

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**I**MPETIGO contagiosa is an acute inflammation of the skin in which there is the formation of flat vesicles which become pustular. It is met with at all ages and in all social grades, but especially in the less favoured classes. This is particularly evident in the work of school clinics where the incidence of the disease is much greater in schools attended by children from the poorer quarters of the city. Defective domestic hygiene and neglect are factors directly affecting its development and upon their control the prophylaxis of the disease very largely depends. The Children's Act of 1908 imposes parental liability for neglect inducing impairment of juvenile health. Its powers, however, might with advantage be extended so as to authorize the medical examination of parents or guardians where it was suspected that one or other had transmitted disease to the child and maintained the risk of further attacks

Impetigo contagiosa is eminently amenable to treatment and should be much less prevalent. The figures in the last Annual Report of the Education Health Service, Corporation of Glasgow, show 48 per cent. of cases, i.e. little short of half, in a total of 16,335 skin diseases treated at the clinics. Its diminution depends mainly on the active co-operation of parents and guardians, and this is often difficult to secure George Augustus Sala said that a man who only once in seven days took a bath could not be called a cleanly person. If the community generally would even practise this infrequent complete ablution the incidence of impetigo

contagiosa would fall very appreciably. While want of domestic hygiene plays an extremely important contributory rôle in the maintenance of the disease, it is not its immediate cause. In the micro-organismal flora constantly present on the skin streptococci and staphylococci are found, their numbers varying according to the degree of personal cleanliness. Sabouraud has demonstrated that by taking the exudation early from the vesicles a pure culture of the streptococcus may be obtained by growing it on fluid media in a capillary pipette. Staphylococci are also found in the lesions, but the primary cause is doubtless a streptococcus. It has, however, been claimed that lesions resembling impetigo contagiosa may be produced by staphylococci. Any breach of the epidermis is liable to coccal invasion, when the virulence of the organisms and the degree of resistance of the individual will determine whether or not the disease will appear. A very frequent predecessor and accompaniment of impetigo contagiosa is pediculosis capitis. The associated itching of this latter excites scratching with consequent breaches in the epidermis through which cocci enter.

In an analysis of 5,655 cases of skin diseases seen at the Western Infirmary, Glasgow, 1,115 were impetigo contagiosa, i.e. 19.7 per cent. The disparity between this percentage and that of the Education Health Service is owing to the latter's statistics being only of children between the ages of 5 and 14 years. The incidence of pediculosis capitis in these 1,115 cases of impetigo is 62.8 per cent., of which males show an incidence of 52 per cent. and females of 73.2 per cent. In an analysis "Age Groups and Incidence" compiled by my resident assistant, Mr J. G. Thomson, it will be seen that 78.5 per cent. of the cases of impetigo contagiosa occurred in the first three quinquennia, due doubtless to maternal neglect and the greater risks of contact during school

years After the third quinquennium there is a strikingly rapid fall, due to an awakening of self-

IMPETIGO CONTAGIOSA IN RELATION TO  
PEDICULOSIS CAPITIS

(Western Infirmary, Glasgow.)

—	Impetigo (No Ped Cap)	Impetigo (c̄ Ped Cap)	Total
Male Cases - -	260	282	542
Female Cases - -	153	420	573
	—	—	1,115

AGE GROUPS AND INCIDENCE  
(Western Infirmary, Glasgow)

Quinquennia

No of Cases Males	1-5	5-10	10-15	15-20	20-25	25-30	30-35
	152	134	129	44	25	17	6
	Quinquennia						
	35-40	40-45	45-50	50-55	55-60	60-65	65-70
	5	4	1	1	1	0	0

Quinquennia

No of Cases Females	1-5	5-10	10-15	15-20	20-25	25-30	30-35
	173	133	148	57	22	11	17
	Quinquennia						
	35-40	40-45	45-50	50-55	55-60	60-65	65-70
	11	5	3	4	1	2	1

respect or an increased resistance of the skin.

Most authors allude to impetigo contagiosa as a

complication of pediculosis capitis and such is indubitably the case, but this does not conform with the description by Tilbury Fox, who first described the disease, and differentiated it from eczema, in 1862.<sup>1</sup> He stated in the 1873 edition of his textbook, "usually no pediculi and no offensive smell are present." He also states: "It is ushered in occasionally by smart, generally by slight fever. There is clearly an affection of the system at large before the occurrence of any eruption. In the summer of 1870 I had a large number of cases under my care at the hospital and in many instances there was smart pyrexia accompanying the development of the disease." I do not systematically take the temperature in impetigo contagiosa—time precludes it; and it is the exception to transfer an impetigo patient from the outdoor department to the wards; but in confluent cases pyrexia may occur. I recall that of an Argyll and Sutherland Highlander some twenty years ago whose temperature, when in hospital, rose to 102.5° F.

Impetigo contagiosa may cloak other skin affections, especially where itching is a feature, such as scabies. It may complicate and temporarily obscure tinea tonsurans. I never like to see it in the bearded region, fearful lest a staphylococcal infection of the hair follicles should occur and sycosis supervene.

In an analysis of hospital cases extending over three years there did not appear to be any marked seasonal variation. Impetigo contagiosa occurs also in the more favoured classes. The public school boy is not exempt from "scrumpox." It would appear that some schools of this class are more liable to it than others. Certainly the bathing facilities in some might with advantage be increased. Its incidence, certainly infrequent, in the cleanly and well-to-do is, however, not surprising when it is considered that some strains of streptococci separated from their

human host, but in favourable circumstances of moisture and temperature, may retain their vitality for even as long as three months. This suggests innumerable channels of contagion. The herding together of all and sundry in cinema, train, tram and 'bus, and the promiscuous methods of some barbers are contributory causes in the dissemination of the disease.

Pediculosis capitis has been seen in church long since it was detected there by Scotland's national bard, and inspired the poem in which there occurs the oft-quoted couplet.

" Oh would some Pow'r the giftie gie us,  
To see oursel's as ithers see us "

This affection may be introduced into the household by domestic servants. I recall an instance which was probably responsible for a suppurative adenitis of an infant member of the family.

The lesions of impetigo contagiosa are superficial and characterized by rapid evolution. The roof of the vesicle is formed of the horny layer which has become raised by a serous exudate containing the causative cocci and accompanied by some degree of leucocytic infiltration of the dermis. The lesions begin as small erythematous macules, quickly developing into flat vesicles which soon become purulent and dry to honey-coloured yellowish crusts — not infrequently yellowish brown or greenish. They are but slightly adherent, having the "stuck on" appearance to which Tilbury Fox alludes. If they be detached at an early stage, the red base is seen to be moist and oozing, at a later stage it is dry. The lesions are discrete, or in groups of varying size. There may, however, be confluent cases where a large part or practically the whole of the face may be involved. I recall one secondary case where virtually the whole of the inner surfaces of the thighs presented two enormous plaques of crusts. The primary condition was scabies,

but it was the thigh lesions to which the patient drew attention. The itching mentioned by some authors appears to me to depend rather upon the presence of pediculosis or other primary itching affection upon which impetigo has been imposed. This may be specially evident in the suboccipital region when pediculosis capitis is present

No part of the skin is immune, but the face is most frequently affected, especially about the mouth. Doubtless the contagion, in some instances, is conveyed by the common use of drinking vessels or their want of cleansing. Even the commendable virtue of generosity in a kindly but defectively brought-up child who offers a bite of its "piece" or apple to a companion may operate similarly. Auto-inoculation by the fingers, clothing or towel is obvious. The superficial whitlow sometimes seen may here be mentioned. Enlargement of neighbouring glands in impetigo is of frequent occurrence and may end in suppuration. In scalp lesions there may be accompanying staphylococcal invasion of the hair follicles with possible consequent permanent baldness of the area affected.

The typical features of impetigo contagiosa may undergo topographical modification. This occurs in the flexures and post-auricular regions where a red oozing surface is seen, the margin of which may show lesions presenting the usual features of the disease.

A variety not often seen, at least in my practice, is *impetigo circinata*, where the central portion of large lesions dry to thin crusts with a consequent accentuation of the periphery. It might be mistaken for *tinea circinata*.

The vesicles of impetigo contagiosa may develop into bullæ of varying sizes giving rise to the variety *impetigo bullosa*. This variety may occur in infants, and doubtless the majority, if not all, of the cases at one time diagnosed as pemphigus neonatorum were

really of this nature. The infection in most cases is probably via the umbilical stump. It may have a fatal termination, and is sometimes traceable to the common variety in midwives and nurses. It has to be distinguished from the bullous congenital syphilide, the absence of concomitant signs of specific disease or a negative Wassermann reaction will differentiate it from the latter condition.

Sometimes with the ordinary type of impetigo and at other times quite independently of any phlyctenular manifestations whatsoever there occur dry furfuraceous patches with or without a varying degree of erythema. These lesions are probably of coccal origin and frequently dependent upon a chronic otorrhœa or nasal discharge or associated, as first stated, with impetiginous lesions of the common variety. Impetigo of the labial commissures may occur as crusted cracks or as merely fine scaliness with or without a varying degree of redness.

*Ecthyma*, separately described by some authors, is a more deeply operating streptococcal infection favoured by conditions of lowered general health and diminished local resistance of the skin. Ulcers result with adherent dark crusts and definite red areolæ. The buttocks and thighs are especially affected. MacCormac<sup>2</sup> draws attention to the not infrequently occurring papillomatous growths resembling verrucose tuberculosis following upon primary or secondary ecthyma occurring in the troops in France where the *Streptococcus faecalis* appeared to be the causative organism.

*Impetigo of Bockhart* is a pustular affection of the pilo-sebaceous follicles due to the *Staphylococcus aureus* and may complicate the phlyctenular type, itching eruptions and the application of irritants.

Two affections in which streptococci play a contributory if not the sole etiologic rôle must be briefly mentioned. (a) *Dermatitis gangrenosa infantum* in which the *Bacillus pyocyaneus* has been frequently

found. The lesions become gangrenous and mainly affect the lower part of the body and thighs, but may be widely disseminated. It occurs in young and weakly infants and may follow varicella vaccination, or (b) *Dermatitis vacciniiformis infantum*. Here the *Bacillus coli* has been found. The vesicles appear on the buttocks and genital regions and rapidly become purulent and ulcerative.

Most cases of impetigo contagiosa yield readily to treatment and the method recommended by Tilbury Fox remains but little changed. He writes: "I invariably use an ointment containing five grains of the ammonio-chloride of mercury (hydr ammoniat) and apply it to the surface beneath the scabs which I cause to be removed by poultices and fomentations with hot water." The borie acid starch poultice is one of the best for this purpose. The ointment base may be ung. zinci, vaseline or equal parts of it and lanoline to  $\frac{3}{5}$  of which hydr. ammoniat gr. v is added. Where possible, the ointment should be applied on lint and always so at night to avoid contamination of the pillow, etc., and consequent auto-inoculation. Owing to maternal neglect some cases do not satisfactorily respond. There are, however, occasionally cases, mainly of the extensive confluent variety, which are intractable to this treatment. In such I have found an aqueous lotion of ichthyol from 5 to 15 per cent, usually 10 per cent, applied on lint, of great value. It should be dabbed on to the parts, the soaked lint applied and changed night and morning with a midday moistening, with the lotion, of the exterior of the first dressing. The dressings should be moistened with tepid sterile water before removal.

Where fissures occur, as at the labial commissures and post-auricular regions, a 2 per cent aqueous solution of silver nitrate may be used two or three times a week in conjunction with ammoniated mercury



ointment, grs. v ad  $\text{ʒi}$ . MacKenna<sup>4</sup> strongly advised for dry furfuraceous patches.—

R	Ung hydr nit dil	-	-	-	-	$\text{ʒi}$
	Ung acid salicyl	-	-	-	-	-
	Glycerini amyl	-	-	-	-	aa $\text{ʒi}$

In bullous cases the lesions should be punctured with a sterile needle and a dressing of boric acid ointment applied. In infants the bullæ should be similarly treated and boric acid baths cautiously given, followed by dressing with boric acid ointment to which grs. v hydr ammoniat. might be added. In dermatitis gangrenosa infantum Adamson<sup>3</sup> recommends boric acid baths, the application of perchloride of mercury 1-2,000 and good feeding; similar treatment is indicated in dermatitis vacciniiformis infantum. In ecthyma the general health may require attention. After removal of the crusts with wet dressings the parts should be swabbed with a lotion of resorcin gr. x ad lot acid. borici  $\text{ʒi}$  and hydr ammoniat gr v ad vaselin.  $\text{ʒi}$  applied. MacCormac<sup>2</sup> recommends a 3 per cent. and MacKenna<sup>4</sup> a 1 per cent. solution of argent. nit. in spt. aetheris nitrosi. Where pediculosis capitis is present, treatment for that condition is obviously imperatively necessary.

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# The Modern Treatment of Lupus Vulgaris

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THE treatment of lupus vulgaris varies with the site, number, size, and type of the patches, and even in a given case there is not yet any general agreement exactly how it should be dealt with. Considerations which lie at the base of any treatment are:—

(1) Rapidly multiplying cells are more vulnerable than normal tissue-cells. What has been gained in power of multiplication has been lost in power of defence.

(2) A nodule of lupus is composed of a group of smaller nodules. Could the tissue in which it is embedded be dissolved away, the internal surface would appear mammillated.

(3) Infective material is most abundant in the granulation tissue about the lupus areas (Buchardi<sup>1</sup>), i.e. in the outer zones of the nodules, presumably because the epithelioid cell mechanism has been able, at any rate in part, to deal with the infection in the centre.

(4) While subcutaneous nodules occur, the majority of the foci are in the corium, and there is therefore a layer of corial connective tissue between them and the subcutaneous tissue.

(5) A rapidly growing nodule is likely to break through the covering epidermis, and the lupus mass so exposed is easily infected by pyogenic organisms—mixed infection in ulcerating lupus.

(6) The patient's general health is a factor of great importance.

## GENERAL MEASURES

The essence of treatment is destruction of the

nodules. General apart from local measures have a very limited value. Cases have been known to clear up under hygienic measures, but the probability is so slight that it may be neglected. On the other hand, they are admirable, and often necessary adjutants. The same thing may be said of injections of tuberculin (usually Koch's A.T. or T.O.T.).

Injection of gold salts have been tried recently. My experience is limited to the proprietary preparations, autrophos and solganal B. and a preparation made up according to a formula of my own, consisting of chloride of gold, sodium chloride, and glucose. The conclusions derived from a rather limited experience are: they are useless in ordinary active lupus, closed or ulcerating; they have some value after the nodules have been dealt with in other ways; and, lastly, isolated nodules in an old case, with much scar tissue, may disappear. If the action be not direct on the tuberculous tissue, but, as has been suggested, by increasing the development of scar tissue so that the focus is starved, the benefit in the cases mentioned receives its explanation.

#### LOCAL MEASURES

The methods in use may be divided into: (a) excision of the whole area: (b) the application of caustics, usually chemical: (c) some form of ray therapy.

*Excision*, when applicable, is ideal, for a scar of some sort is inevitable by any method, but it can be applied only when the lesion is small enough, and the surrounding tissues lax enough. Unfortunately, these conditions are not often present in the face where the disease is commonest.

*Caustics*: (A) *Physical*.—The actual cautery, Paquetin or electric, is non-selective in its action. If the nodule is thus burned away, a certain amount of normal tissue is also destroyed, including the whole of the corium immediately surrounding the nodule. The

result is a depressed scar somewhat disfiguring. If not done so thoroughly the disease recurs. *Diathermy* is much better. The caustic action spreads from the needle and weakens as it spreads, so that, in a successful case, the normal tissues recover while the more vulnerable diseased tissue dies; but since the infection is greatest in the peripheral zones of the nodule, it is difficult to estimate the correct amount of current and the length of application. *Carbon dioxide snow* is useful for an area of some size. It is difficult to apply to discrete nodules. Probably, the beneficial action, when the whole tissue of the area is not killed, is due to inflammatory reaction stimulating the sluggish defence mechanisms. The human body is apt to give way slowly to an invader if its advances are made slowly, and do not cause much irritation.

(B) *Chemical*—These are, mainly, carbolic acid, pyrogallol, acid nitrate of mercury (Adamson<sup>2</sup>), trichloroacetic acid, lactic acid, antimony trichloride (Darier<sup>3</sup>), zinc sulphate (Schlammadinger<sup>4</sup>), permanganate of potash (Lancashire<sup>5</sup>). All are in use. Some have been described as selective caustics. In my opinion there are no selective caustics. I agree that a few selective agents exist, which attack certain germs, in preference to normal tissues, but these are not caustics. The caustic appears to be selective because of its greater action on the diseased tissue, but this is merely an indication of the greater vulnerability of this tissue. *Acid nitrate of mercury, trichloroacetic acid, lactic acid*, when used alone are either applied on swabs or pushed into nodules on the points of match sticks. This action is comparable to that of the actual cautery, and the same remarks apply. *Acid nitrate of mercury* applied on swabs as above, but followed by a carbolic ointment, has been used by Somerford.<sup>6</sup> *Zinc ionization* has been recommended by MacKenna<sup>7</sup> for small nodules. This is not open to the objections raised to the actual cautery or its chemical analogues.

The difficulty is, as in diathermy, in estimating the time and current to get destruction of diseased with *minimal injury to normal tissue*. *Pyrogallol* is an excellent caustic. It is generally used in 20-25 per cent. strength as an ointment or plaster, but can be quite well applied as a 10 per cent, or even 5 per cent, ointment if thoroughly rubbed in

The appearances produced are the guides as to the amount of application. The area turns black and after a time pits appear in it where presumably nodules have shelled out. If the application be persevered with after this the normal tissues will be destroyed and a *disfiguring* and even adherent scar finally left. The area should be allowed to heal under a simple ointment when the pits have appeared, and later the treatment repeated when fresh nodules are seen. It is not to be expected that one treatment will remove all the tuberculous material. The treatment is rather painful, and requires a good deal of fortitude if carried out by the patient himself. My best results have been obtained in young people, who were treated by relatives who disregarded their tears. One case of extensive areas on limbs, body and face, was cured by this method, but the treatment lasted with intervals three or four years. The scars left were excellent, supple with no contraction.

The best way of applying *carbolic acid* is by a method introduced in Germany under the name of "pyotro-pine." I introduced a substitute for this of much the same composition <sup>8</sup>

An approximately 30 per cent solution of carbolic acid in 33 per cent caustic potash, containing some precipitated chalk is rubbed over the area by a cotton-wool pencil. The epidermis is dissolved off and the nodules as the rubbing continues stand out as purple spots. The rubbing is stopped when these are well marked, if it were continued the normal tissue would be attacked and a slough would form. A dressing is then applied on lint of a paste containing salicylic acid, salicylate of soda, cane sugar, and glycerin—a hypertonic application. This relieves the pain at once, and the whole is covered in with an occlusive dressing. At the first dressing the purple nodules are often found on the dressing, and the area when cleaned up is red and pitted. The application is renewed twice a week, but the alkaline carbolic acid is used at half strength, and dabbed on, or only gently rubbed in. Eight applications are usually required on the limbs or other areas where the skin is fairly stout. On the upper chest, neck or face, as a rule fewer. The area is then allowed to heal under boric ointment. The immediate results are remarkable, the area is apparently cleared, and sometimes this is permanent, with a satisfactory scar, but as a rule scattered nodules reappear after a time. It is not advisable to repeat the treatment about the face or neck, for hypertrophic scars may be produced.

The nodules should be dealt with separately. In a number of cases complete relief has been obtained without recurrence for three years. It is difficult to apply this method where surfaces are not flat, as about the nose.

*Combined method—curetting followed by a caustic*—This is, in my opinion, the method of choice in most cases about the face, except (a) when a single lesion covers a small area only, (b) when the edges of the nostrils are attacked, (c) when the general health is poor and resistance therefore low. In all these cases Finsen light treatment is definitely indicated as the best, if not the only, effective method.

Curetting must be done thoroughly. First the nodule is scraped away as completely as possible with a small spoon. Next one pays special attention to the edges, curetting them all round, the aim being to produce if possible a shelving edge. A tiny overhanging piece of normal tissue is best cut away with a curved scissors. Finally, a specially small oval spoon is used for the base. The transverse width of this at its widest is about one-tenth or one-twelfth of an inch. With this the small depressions representing the bases of the nodules, which are the appearances in reverse of the mammillations mentioned in consideration(2), are dug out. The base should now appear pitted. Any nodule just inside the subcutaneous tissue will be found, for the spoon will penetrate the corium at that point; elsewhere a layer of corium will be left. One should wait after this until all oozing of blood ceases, or the caustic application will not be effective, the chemical being diluted and carried away by the blood. Then the whole area is dabbed lightly with the caustic. I prefer a 90 per cent trichloroacetic acid solution, but probably almost any caustic would be adequate. The object is to produce a paper-thick layer of necrosed tissue over the whole surface, and so deal with any bacilli which may have escaped destruction before. The application of caustics is for this only and not as a substitute for thorough curetting.

Trichloroacetic acid in particular if too freely used produces hypertrophic scars. A dry dressing is applied, and removed in three or four days, and since there is usually some moisture then boric ointment permits of healing. Sometimes the place heals under a dry scab. The scar is ultimately good, and unless the corium has been in parts completely destroyed by the disease there is no contraction.

*Ray treatment.*—Finsen light treatment by the Finsen or Finsen-Reyn lamp gives the best cosmetic results, and in addition is applicable to the nostrils where no other treatment which I have used can cause the disappearance of the disease without also producing marked deformity. It is, however, an expensive method, a method also demanding considerable skill on the part of the operator and great patience on the part of the nurse applying the compressor, and above all, it is a very slow method. The nurse must hold the compressor in which water is circulating on the affected area for three-quarters of an hour and upwards. The operator must see that the surface of the compressor is accurately perpendicular to the entering rays, and no dimming of the quartz surfaces by any impurity is permissible. The apparatus is expensive and the current used considerable. The final result must not be expected under several months.

While Finsen light treatment may be considered the best of the modern methods, if time and expense are to be considered the curetting and caustic method, and on the limbs the alkaline carbolic acid method, merit serious consideration, in both, but especially the first, final results are often rapidly attained. Three or four weeks may see epithelialization complete and, in some cases at any rate, there is no recurrence. The scars, though not so good as after Finsen light, are satisfactory and the disfigurement slight.

*Ultra-violet light*, when applied by the Kromayer lamp, can also be effective. Compression is possible

by the apparatus itself. The mode of action, results, and time necessary appear to be much the same as with the Finsen light. The apparatus, however, easily gets out of order, and less accuracy is possible in its application to small areas.

*X-rays*.—These have fallen into disuse. Numerous applications are necessary, and these are liable to be followed by atrophy of the skin with extensive scarring, telangiectases and pigmentation. Cancer, too, may develop. To-day it may be legitimate to reduce a hypertrophic lupus by X-rays before resorting to more usual methods of treatment, but I should not care to use them for an ordinary case. Nevertheless, the method has a future when long rays of the Bucky type have been further developed. At present we can screen off soft rays, but not hard rays. Tubes are needed which will give only soft rays, and their penetration should not be further than to the subcutaneous tissue.

*Radium* has not been found better than other methods. If the beta rays could be used alone, they would probably act admirably as a slow caustic. Unfortunately, the gamma rays must also be present, and with them the danger to normal tissues, for it does not appear that the "selectiveness" (really vulnerability of the cells) is so marked as in malignant disease.

*General treatment by ultra-violet rays*.—I have deferred to the end on account of its importance the great value, when applied to the general surface of the body, of ultra-violet rays, whether derived from the sun, the open arc, or the mercury vapour lamp. When the body as a whole is exposed to these in the proper way the effect in improving the general health is striking. The mercury vapour lamp is placed three feet away from the patient twice a week, exposing the back and then the front for a period which is just short of producing a mild erythema, as indicated by slight



irritation some hours after, reported by the patient. The period varies with the patient and increases as the skin becomes acclimatized. So remarkable is the general tonic effect that it points to the probability that the skin is not merely a mechanical protection and a means of regulating body heat, but also possibly the seat of antibody formation. General health seems to be bound up with the health of the skin, and therefore any treatment of lupus vulgaris should be accompanied by the stimulation of the skin which ultra-violet rays alone can give.

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# Carcinoma of the Skin: Its Treatment by Radium

By ROY WARD, M B

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CARCINOMA of the skin is essentially an infiltration of the epidermis and tissue spaces by epithelial cells which have acquired the malignant neoplastic property. Histologically, three types may be recognized: (1) Squamous-celled carcinoma (2) Basal-celled carcinoma or rodent ulcer. (3) Melanoma.

The squamous-celled growth is characterized by the presence of prickle cells, of cells containing granules of eleidin, and by the formation of cell-nests. The basal-celled growth or rodent ulcer is composed of solid masses of small cells, which are entirely devoid of prickles, and never become keratinized to form cell-nests. The cutaneous melanomas may be divided into two groups. Whereas the melanotic sarcoma arises from the connective tissue chromatophores and has the structure of a spindle-celled growth, the melanocarcinoma is said to take origin from the rete Malpighi of the epidermis, and consists of polygonal or spheroidal cells grouped in a solid alveolar arrangement like a carcinoma.

Although the microscopical appearance of a typical growth in any of these groups is extremely characteristic, great variation in structure often makes the histology an exceedingly difficult matter. In the more rapidly growing tumours there is often considerable variation in the size, shape and arrangement of the cells, and the section may be altogether a typical and even resemble a spindle-celled growth. Occasionally the features of both a rodent ulcer and squamous-celled carcinoma may be demonstrated in different parts

of the same growth In a small and interesting group of cases the prickle-cell element appears to be the predominating feature, and some pathologists have called these growths "prickle-celled carcinomata" They present certain clinical characteristics and may be recognized as a clinical entity.

As elsewhere, an early diagnosis is essential if satisfactory results are to be obtained. Far more important, perhaps, is the recognition of some of the commoner precancerous conditions, many of which can be cured by a short surface application of radium The exciting and predisposing conditions which may give rise to cancer of the skin are numerous, and include keratoses, xeroderma pigmentosa, pigmented warts and moles The origin of epitheliomata has often been associated with old scalds or burns, animal and insect bites, chronic ulcers and sinuses, lupus vulgaris and lupus erythematosus Although lupus-epithelioma is usually associated with prolonged X-ray treatment and radio-dermatitis, it has been pointed out by Sampson Handley that this condition existed long before the discovery of X-rays, and he quotes three cases which had never been subjected to radiation. In the same paper he points out that the non-ulcerative forms of lupus usually show papillary hypertrophy, caused by the blocking of the central lymphatic vessel of the papilla He believes that lupus-carcinoma originates in these areas of hypertrophy

There is no doubt that cutaneous cancer may follow prolonged or excessive irradiation of the skin, more particularly when the softer rays are employed Before adequate protection was introduced, the hands of the earlier workers in X-rays and radium became subjected to repeated short doses of soft rays This cumulative irradiation first produced a chronic radio-dermatitis, and later, epitheliomatous changes Workers in gas-tar, pitch, and other products of the destructive distillation of coal, often suffer from pitch warts, and sometimes

these lesions become epitheliomatous. Bayet and Slosse suggest that the causative agent is the very small quantities of arsenic present in pitch and tar, but this view is not generally accepted. An important part played by radium in the prevention of skin cancer is in the treatment of pitch warts. Their prompt removal at a precancerous stage diminishes the number of cases of tar-epithelioma. Pitch warts can be cured by a single short application of radium, and this is important from an economic point of view, as the patient is able to return to work without loss of time.

*Squamous epithelioma* of the skin may be primary or

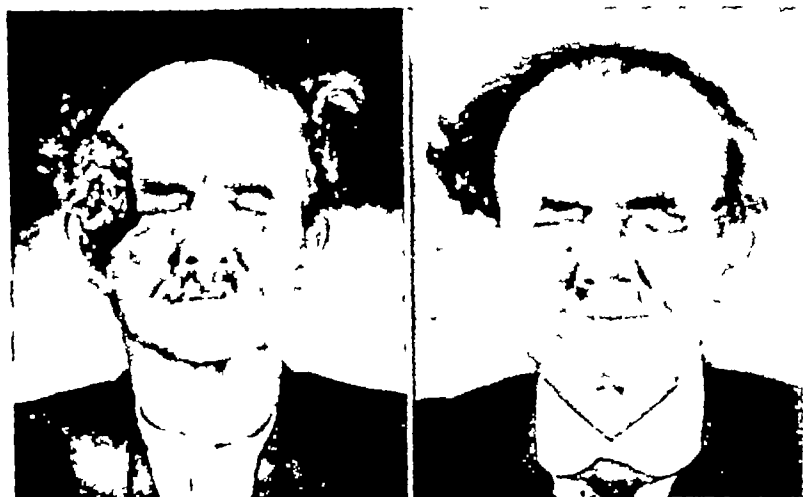


FIG. 1—Squamous epithelioma, before and after treatment

secondary. Clinically, it is seen in two main varieties, the ulcerative and the hypertrophic. The ulcerative variety is indurated and infiltrates the surrounding tissues. The edges of the growth are raised, hard and often everted. The hypertrophic or papillary lesions usually grow rapidly, but are mobile on the deeper structures except in the later stages. Both forms grow comparatively slowly compared with epitheliomata of other tissues, and metastases are late. Except in the very early stages these lesions have a characteristic odour.

*The prickle-celled epithelioma* is a rapidly growing

lesion of the papillary type. The history is therefore short, often only two or three weeks. On examination the growth is found to be covered with a thick layer of necrotic material. Although firmly adherent, it can be removed; when this is done numerous finger-like papillary processes can be seen extending into the growth. It bleeds easily, and as it tends to give rise to metastases more readily than other skin carcinomas it should be treated without delay. It is a very radio-sensitive growth.

*Transitional-celled epithelioma.*—Although there may be extensive local destruction a rodent ulcer never

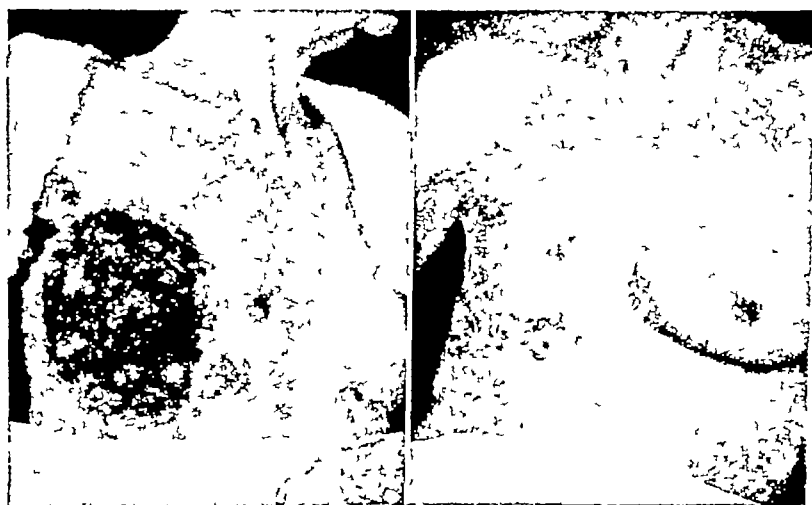


FIG. 2.—Carcinoma of the skin, secondary to carcinoma of breast, before and after treatment.

gives rise to metastases unless it assumes the clinical and histological appearances of a squamous-celled growth. When this occurs the disease progresses rapidly, and the change is sometimes associated with unsuccessful radiation and marked secondary infections.

*Secondary carcinoma* of the skin is most frequently seen in relation to recurrent carcinoma of the breast. The subcutaneous nodules of growth, the infiltrated skin and ulcerated areas often respond in a remarkable way to radium therapy. Although it is doubtful if

radium prolongs life in these cases, the palliative relief cannot be over-estimated.

*Rodent ulcer* usually begins as a smooth pearly nodule which grows very slowly, often assuming the form of a rosette of nodules with a raised margin and a depressed centre. This is the *early hypertrophic* variety. More nodules may appear and coalesce to form a growth of the *large hypertrophic* variety. On the other hand the growth may break down and form a superficial ulcer with a gelatinous base and a raised pearly margin. This is the *superficial cicatrizing* variety. The disease may extend deeply to reach the underlying tissues,



FIG 3—Rodent ulcer, superficial and deep ulceration, before and after treatment

forming irregular cavities. Such lesions of the *deeply ulcerative* variety seldom have the typical rolled edge, and are usually associated with a marked degree of secondary infection.

Other rare forms may be seen. The *morphea* type occurs on the face, is usually ivory white in colour, and appears to be inset in the skin. The *psoriasis* type is often multiple and usually occurs on the trunk. With a magnifying lens the characteristic rolled edge at the margin of the large scaly patch can be seen. Occasion-

ally two different clinical varieties of rodent ulcer may appear in the same lesion. A hypertrophic growth may become superimposed on a rodent ulcer of the psoriasis type.

*Etiology* — Squamous-celled growths may attack any part of the skin, but are commonly seen on the face and scalp, especially in the neighbourhood of the pinna, another common situation is the dorsum of the hand. Rodent ulcers are most frequent on the nose and cheek. Out of 1,773 consecutive cases treated at the Radium Institute more than 50 per cent. occurred in these situations. Both types of growth occur late in life, most frequently between the ages of 60 and 70.

*Diagnosis* — The clinical diagnosis of skin epithelioma is comparatively easy. As there is a possibility that trauma may activate a growth, biopsy should be carried out in doubtful cases only. Tuberculous ulcerations and syphilitic lesions sometimes present difficulties, and these must be excluded by the history, a biopsy, and a Wassermann test.

*Radio-sensitivity and dosage* — Without a microscopical section as a guide to the treatment, dosage must be estimated empirically on the past experience of successfully treated cases. At the Memorial Hospital (New York) an attempt is being made to put irradiation dosage on a more scientific basis. It is pointed out that it is essential to determine the degree of malignancy and the degree of radio-sensitivity of every variety of tumour on account of the wide variations which exist in clinically identical groups of cases. The radio-sensitivity is therefore first graded by the pathologist. On this information the minimum intensity in terms of the number of skin erythema doses required is determined, and the most beneficial way of giving this dose is calculated, whether this be by interstitial or surface irradiation.

Another method of standardizing dosage has been

devised by Murdoch (Brussels), who expresses the dose in terms of the energy absorbed by the tissue, using the erg centimetre milligramme hour unit.

By grading carcinomata into four groups, I, II, III, IV, Broders (Mayo Clinic) distinguishes between the highly differentiated adult type of growth, and the non-differentiated, very cellular, highly malignant variety. On this classification he explains the failure of many surgical operations in cases of high malignancy, and the unusual reactions to irradiation in growths of different grades. The non-differentiated types are extremely radio-sensitive. A more intensive dose of irradiation is usually required to bring about regression of a tumour of the highly differentiated group.

Inflammatory changes in a growth decrease its radio-sensitivity, increase that of the surrounding tissues, and thus cause the radio-sensitivity of the cancer cell to approximate closely to that of the normal tissue cell. Application of radium will only impair the vitality of the normal tissues and produce radio-necrosis. A marked degree of infection definitely contra-indicates any form of radium therapy. The normal tissue reaction, which is so important in successful treatment, is upset and the growth becomes more active. Further radiation will only increase the infective process.

*Treatment*—There is no doubt that radium is the treatment of choice in most cases of skin epithelioma, except in melanotic carcinoma, which should always be excised widely and without delay. This should be done preferably with the diathermy cutting needle and the area subjected to a prophylactic irradiation. It is in the so-called "epidermoid" epitheliomata that the most striking and permanent results are obtained by radium therapy.

The treatment of cutaneous cancer has been established for years. More than a quarter of a century ago Wickham and Degrais, by their work on superficial conditions, indicated the possibilities of radium therapy.



Surgical removal is equally effective in some cases, but, from a cosmetic point of view, complete excision even of a small growth is difficult in those situations most commonly affected. Radium treatment is not only more conservative, but cosmetically gives results which cannot be obtained by any other method. Recurrences are frequent after X-rays, probably because the action of the rays cannot be limited with such great accuracy. The use of carbon dioxide snow, nitrate of silver, tincture of iodine and other caustic methods is usually unsatisfactory. The repeated application of any caustic agent to a precancerous lesion is definitely dangerous. It tends to irritate these conditions, which may take on rapid growth in consequence.

The use of radium by those with little experience cannot be too strongly condemned, especially in the treatment of skin conditions in which a thorough knowledge of the physical properties of radium and the principles of filtration is of paramount importance. When selecting the type of apparatus and filter, it must be borne in mind that every neoplastic cell must receive a minimum lethal dose. It is therefore desirable to distribute the dose as homogeneously as possible, and this can only be done by irradiating well beyond the depth and lateral limits of the tumour. The fundamental principle underlying all radium therapy is the estimation of the dose which will be sufficient to bring about the death of all the malignant cells without impairing the vitality of the surrounding normal tissue, so that healing will take place satisfactorily. The success of radium in the treatment of skin cancers depends not only on accessibility, but on the marked difference which exists between the susceptibility of the cancer cells and that of the normal skin. This probably accounts for the equally good results obtained at various radium centres, although the methods adopted are, in many cases, quite different.

*Filtration.*—The object of filtration is to cut off

various proportions of the beta rays, and sometimes the softer gamma rays in addition. The screen to be chosen depends on the amount of penetration required, and this in turn depends on the thickness of the metal and its density. Lead and platinum are most commonly employed.

*Secondary radiation* —The passage of gamma rays through metal screens gives rise to the production of secondary rays which are of the soft beta type, and are capable of causing considerable surface irritation, or even ulceration, thus giving rise to a radium burn. For this reason it is generally necessary that they should be absorbed, and this is effected by the interposition of several sheets of black paper together with lint and thin rubber between the outer surface of the screen and the skin of the patient. In the case of tubes, these are covered with rubber, cork or vulcanite.

*Apparatus* —For contact surface irradiation, a suitable full strength plate is employed. These plates consist of solid plaques which vary in size and shape and contain 5 milligrammes of radium element per square centimetre. When it is necessary to irradiate only the more superficial layers of the skin, an unscreened applicator is used. By using a light screen, such as 0.1 millimetres of lead, the less penetrating rays which only act near the surface are absorbed, leaving a more penetrating but weaker radiation, which must be employed for a correspondingly longer time. For deeper penetration it is necessary to filter off all the beta rays and even some of the softer gamma rays. For this purpose a screen of 2 millimetres of lead is used.

When it is necessary to irradiate a larger or more penetrating growth a mould composed of Columbia wax, Stent, or sorbo rubber can be used, the radium being disposed in the form of needles, tubes or plates on the outer surface. This not only absorbs the secondary beta radiation but provides a more homogeneous dose by reason of the distance between the radium and the lesion. These radium plaques should always be composed of multiple foci heavily screened, and arranged in such a way as to produce a comparatively homogeneous irradiation on a plane at a distance equal to the thickness of the plaque. The screening should always be 2 millimetres of lead or its equivalent.

For interstitial irradiation two groups of needles are recommended. Those most commonly employed are of low content with walls of 0.6 millimetres of platinum, and containing 0.5 milligrams of radium element for each centimetre of active length. The linear intensity of the second group is much greater. They contain

2 milligrammes of radium per centimetre of active length and have walls of 0.3 millimetres of platinum

Radon seeds have many advantages over radium element needles in the treatment of skin epitheliomata. They may be varied in size and filled to almost any intensity, moreover, a radon seed is active over the whole of its length, and its linear intensity cannot vary in different parts of the seed, whereas in a radium needle the eyelet and point are inactive, and the linear intensity may vary slightly owing to defective filling. Probably the most important advantage is that they can be employed in many situations where it would be impossible to apply needles.

Although the intensity of radon diminishes by 16 per cent per day, the therapeutic activity is sufficiently long to produce the desired effect, as most cutaneous carcinomata are comparatively radio-sensitive. On account of the high cost of platinum, gold is usually employed when making radon seeds. There is practically no difference in the densities of these two metals. It has been found convenient to employ a seed with an activity of approximately 2 millimetres, and with walls either 0.3 millimetres or 0.5 millimetres thick.

*Technique* —For small rodent ulcers, either of the hypertrophic or ulcerative varieties, an exposure to an unscreened full strength applicator is the method of choice provided the growth is superficial and mobile on the underlying structures. This method is also useful in the treatment of early growths of the squamous type. Before applying the plaque, which should be protected with thin rubber sheeting, all crusts must be removed. It is necessary to have a variety of applicators of different shapes and sizes, and an exposure of one and a half to two hours is given. In this way effective dosage can usually be given in one application of radium. A cure is almost invariably obtained. In the superficial cicatrizing variety it is necessary to irradiate a considerable distance beyond the visible margin of the growth, as outlying columns of cells are invariably present in these situations.

As a result of this intense beta irradiation an erythema is noticed in about ten days, reaching its height in about three weeks. Over this inflamed area a crust forms, which may dry and fall off, only to be replaced by another. The last crust usually falls off towards the end of the sixth week, leaving a soft and supple scar. During the reaction no active treatment is required. If

a local dressing is necessary, then unmedicated white vaseline or a very mild antiseptic ointment may be used. The destructive reaction is not marked and the patient is able to lead a normal life after treatment.

Larger ulcers, in which there is subjacent infiltration, must be treated by other methods. A light screen such as 0.1 millimetre of lead should be employed in these cases, and the apparatus applied for two to four hours according to the amount of infiltration present. For still larger ulcerated growths, and for those of the large hypertrophic type, gamma radiation must be used, either in the form of surface or interstitial irradiation.

The use of Columbia paste plaques for prolonged periods of two to three weeks has been advocated by some. The results are usually unsatisfactory and frequently disastrous, for, although in the course of these long applications the rays have more chance of finding the neoplastic cells at the moment of their greatest fragility, it is no less certain that the normal cells of the surrounding tissues are also affected adversely. The prolonged irradiation of the normal cells, and those already debilitated by the spread of the disease or by secondary infections may result, not only in a radium necrosis, but in increased activity of the neoplasm. It is therefore advisable, in order to avoid the disadvantages of prolonged exposures on the one hand, or of insufficient screenage on the other, to employ much larger amounts of radium screened through a minimum of 2 millimetres of lead or its equivalent for a comparatively short period. With this technique the duration of treatment varies between 48 and 72 hours. If the time is increased beyond a total of 72 hours, a damaging effect may be produced, especially in old people. Although, of course, it is desirable to destroy all the neoplastic cells to avoid recurrence, this should never be done at the expense of destroying the adjacent tissues, the integrity of

which is so necessary for satisfactory repair.

For large rodent ulcers, needles with the stronger linear intensity should be used. In the deep ulcerative lesions they are either inserted into or laid along the growing edge for a period of 48 to 72 hours. For the large hypertrophic rodent ulcer the same type of needle should be buried in or around the growth, and a similar exposure given. As a rough guide to the technique it may be stated that no part of the growth should be further than one centimetre from a source of irradiation, and it should be remembered that more massive doses should be placed at the periphery in order to obtain a homogeneous distribution. If needles are placed at the same distance from each other throughout the growth, the centre, being irradiated by its own foci as well as those adjacent, is necessarily exposed to a greater dose than the periphery.

For the larger squamous-celled growths, needles of weaker linear intensity should be used. Both in the ulcerative and warty type, the needles should be inserted in a parallel fashion, the points being introduced into the healthy tissue in the immediate vicinity of the growth. They are allowed to remain in position for a week.

By the end of six to eight weeks the resulting reaction subsides, and the growth gradually disappears, leaving a smooth scar. The primary growth should not be regarded as apparently cured, unless the treated area is perfectly soft. Any residual induration should be excised, as this may be the nucleus of a rapidly growing recurrence. This is done preferably with the diathermy needle.

Most squamous carcinomata run a slow course, and spread to the neighbouring lymphatic glands is usually late. In the large majority of cases the question of treating the glands does not arise. Prophylactic doses of radium are of doubtful value, but the patient should be kept under periodic observation. When glands are

present they should be dissected out if operable, and this should be followed by external irradiation. If inoperable, the surface application should be supplemented by interstitial irradiation. The permanent implantation of gold radon seeds has been found of great benefit in such cases.

The prognosis depends on the histological and clinical type and the extent of the disease. Growths in certain situations have a more serious prognosis. The duration of the disease and the presence of metastases is important. Previous X-ray and radium treatment and the presence of sepsis all tend to make a growth more radio-resistant. The physical condition of the patient has some bearing on the prognosis, radium treatment being always more successful in those patients whose general health has received attention. A very large percentage of all cases has been cured, and generally by one application of radium. The failures occur in those cases of advanced rodent ulcer in which the disease infiltrates the underlying bone or cartilage, and in squamous-celled growths with extensive metastatic involvement.

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# Abstracts of Recent Literature

## *Dermatitis Colonica A Hitherto Undescribed Disease of the Skin*

A Whitfield puts on record a hitherto undescribed and uncommon disease of the skin, for which he suggests the name "dermatitis colonica" He gives notes of several cases, in which the clinical appearances were correlated with the laboratory findings, occurring over a period of nearly twenty years The chief points about the eruption are (1) it is generally slightly or markedly irritable, (2) the borders of the patches show almost discrete flat red macules without noticeable alteration of the consistency of the skin, (3) most important is the well-defined telangiectasis visible with the simple lens In all cases streptococci were in high excess in the fæces, in some cases to the practical exclusion of *B coli*, but the author sees no justification for incriminating any particular organism, though the fact that one can foretell the flora of the fæces from the appearance of the eruption is sufficient evidence that the two are connected Improvement in the condition is brought about by intestinal antiseptics, a slightly modified and digestible diet, and a greater amount of rest before and regularity of meals—(*British Journal of Dermatology and Syphilis*, January, 1932, xlv, 24)

## *Hyperglycæmia and Skin Diseases*

Georg A Rost publishes an article on the relationship between certain disorders of carbohydrate metabolism and certain diseases of the skin It is known to-day that the regulation of carbohydrate metabolism takes place partly through the islands of the pancreas, partly by the suprarenal glands, with the mediation of the sympathetic and parasympathetic nervous system Not only the liver, but also the muscles, the fat-tissue and the skin serve as reservoirs for the blood-sugar or the glycogen produced by it, and the action of different ferments is indispensable Recently it has been learned from the investigations of Zunz that there exists also a central control of sugar metabolism in the thalamic or retrothalamio region of the brain Modern micro-chemical methods have facilitated blood-sugar tests, and a great number of authors have subsequently published the results of their investigations, but their opinions, regarding even the "normal value" (the quantity of sugar contained in 100 c cm of blood of a healthy person after twelve hours' fasting), vary very greatly The method of investigation used by Prof Rost is based on that worked out by Wislicki in His's clinic in Berlin About one thousand cases have been tested by this method in rather over three years, and it has been found that there are two groups of skin diseases in which pathoglycæmic curves are often, though not always, found—namely, dermatitis intertriginosa and psoriasis It is known that in diabetes an intertriginous dermatitis is not uncommon, and it is not surprising to find pathoglycæmic curves in

cases where a "pre diabetic" state is present. In psoriasis the relation to disturbances of carbohydrate metabolism is not so obvious, and there is no reason as yet to believe in a closer connection between psoriasis and diabetes. With regard to eczema in general there is no hyperglycemia, but no doubt a small group of cases exists where pathoglycemic curves are to be found. Whether these cases are real eczema is a matter for discussion. No pathoglycemic curves were found in cases of acne, seborrhoeic eczema, furunculosis and other pyodermias, dermatitis toxica or venerea, carcinoma or tuberculosis of the skin—(*British Journal of Dermatology and Syphilis*, February, 1932, xlv, 57)

### *Treatment of Lupus Erythematosus by Injections of Bismuth*

A Szary points out that though lupus erythematosus has been variously ascribed to the influence of tuberculosis, lympho-granulomatosis, streptococcal infection, and syphilis, its nature is not known with any certainty. In 1913, Ravaut, on the hypothesis that tuberculides occur in the subjects of congenital syphilis, employed "914" with good results, and in 1927 Szary, impressed with the benefit obtained in non syphilitic dermatoses the result of bismuth therapy, treated lupus erythematosus with success. Aqueous or oily solutions or suspensions are used and are well tolerated, and improvement follows rapidly after a few of a series of 12 to 15 injections given twice a week, and a cure follows in about 90 per cent, though a relapse occurs in 20 to 30 per cent. In these circumstances a second series of injections usually brings about a rapid cure—(*Presse médicale*, Paris, 1932, January 27, 153)

### *Generalized Scleroderma in Children*

E L Oliver records three cases and reviews the literature. Among Lewin and Heller's 508 collected cases of scleroderma there were ten only under the age of fifteen years. He concludes that the prognosis of generalized scleroderma is much better in children than in adults. While it is doubtful if there is any specific treatment for this condition, it may be worth while to try thyroid extract, as there are reports of cases improving while under thyroid treatment. The patients should be protected from cold, to which they are often hypersensitive. Massage has in most cases a favourable influence by helping the circulation and restoring some degree of mobility. Where combined with Raynaud's disease and there is much discomfort, sympathetic ganglionectomy should be considered as it has given brilliant results, in these cases removal to a warm climate may be very beneficial. (*Archives of Dermatology and Syphilis*, Chicago, 1932, January, xvv, 72)

### *Eczema*

R Sabouraud in an article on what is and what is not known about eczema summarizes the history and changes of opinion since Willan resuscitated the use of the word for dermatoses of rapid onset without fever but with inflammatory manifestations, over a part



or the whole of the cutaneous surface, and consisting of vesicles of very small size, which rupture and form crusts. He concludes that the word *eczema* is applicable only to red forms of dermatitis with a tendency to exudation and exfoliation, the cause of which is unknown. When the cause of a disease is discovered, this should be expressed and indicated in the name, for example, *eczema* caused by primroses is not *eczema* but a special form of dermatitis due to primroses. The word *eczema* should thus disappear with the advance of knowledge. On the other hand the word *eczematization*, which only describes a clinical and anatomical process of variable forms but fundamentally always the same, and consisting of exoserosis, should always be retained to indicate this form of cutaneous reaction—(*Presse médicale*, Paris, 1932, February 10, 217)

### *Basal Metabolism in Psoriasis*

M. Grzybowski has made a study of the basal metabolism in 44 cases of psoriasis and has come to the following conclusions. In 41 of 47 cases examined by Plantefol's method, the basal metabolism was found to be normal, with no manifest symptoms of any disturbed functioning of the thyroid. Of the 4 cases in which the basal metabolism was found to be irregular, one showed a lowered metabolism, probably due to excessive functioning of the ovaries and the thyroid gland, in 2 cases the metabolism was increased owing to undoubted hyperthyroidism, in the fourth case it was increased, probably owing to the patient's hyperpnea (80 litres in 5 minutes). It therefore seems reasonable to assert that there are no solid grounds for connecting the etiology of psoriasis with disturbances of the endocrine system and particularly of the thyroid—(*Acta Dermato-venereologica*, Stockholm, November, 1931, xii, 381)

### *Mycosis Fungoides*

D. Symmers states that the condition familiarly known as *mycosis fungoides* is one of the most confused and confusing to be encountered in the domain of medicine. In the author's opinion, the post-mortem and histological observations show that *mycosis fungoides* is the cutaneous expression of at least three different diseases of the lymph node system. Hodgkin's disease, a variety of round-celled sarcoma arising from the connective tissue reticulum of lymph nodes or elsewhere, and lymphosarcoma, originating in the lymphoid cells of the lymph nodes or of other lymphoid structures—in short, that *mycosis fungoides* as an independent form of disease does not exist—(*Archives of Dermatology and Syphilology*, Chicago, January, 1932, xxv, 1)

# Reviews of Books

*Diseases of the Skin* By RICHARD L. SUTTON, M.D., F.R.S.E.  
8th edition London Henry Kimpton, 1931 2 vols  
Pp 1,352 Coloured plates 11, illustrations 1,200 Price  
£2 12s 6d

WE welcome the 8th edition of Dr Sutton's well-known textbook of dermatology. Of all the numerous works on the subject produced by the American school this is probably the best and its reputation is amply vindicated by the large number of editions called for within barely twenty years. The work itself has gradually grown from comparatively modest dimensions and it is already some years since it has been found necessary to divide it into two volumes. Meanwhile, the author has been indefatigable in following up and including in his pages all the recent developments of a very active branch of medicine, and the exertions which he has made for this purpose are indicated by the copious bibliography appended to every chapter. Although the author is generous in acknowledging the help he has received from his son and various other people one wonders how he has been able to produce a work of this magnitude while engaged in the active pursuit of his profession. The illustrations, which must always form a most important part of any textbook of dermatology, are numerous and well chosen but we feel compelled to say that the coloured plates do not reach the standard set by the 1,200 untinted photographs. This, however, is not a very serious criticism of the work as a whole and we have no hesitation in commending it to all those who require an authoritative and complete treatise on dermatology.

*Handbook of Skin Diseases* By FREDERICK GARDINER, M.D.,  
F.R.C.S.E. 3rd edition Edinburgh E and S Livingstone,  
1931 Pp xi and 283 Plates 13, figs 46 Price 10s 6d

IN this clearly written and suitably illustrated account of the commoner skin affections the lecturer on this subject in the University of Edinburgh takes the welcome and practical course of dealing with the matter from the point of view of a *raison de faire* rather than a *raison d'être*, though stress is rightly laid on the causation whenever this is necessary for efficient treatment. From long experience the author is able not only to set out the details that are just those wanted by the practitioner, but to give advice as to treatment. Some of these points may not be generally known, thus in the account of simple herpes labialis, due to a virus closely allied to that of epidemic encephalitis, he has found the use of streptococcal vaccine extremely beneficial, and in psoriasis, particularly of the flexures in hypothyroid individuals, thyroid may be most successful. With regard to the common employment of arsenic in this familiar disease it is pointed out that it is chiefly valuable in cases with chronic isolated patches and must be given with great discretion, intermittently, for three weeks with intervals of a fortnight.

*The Science of Signs and Symptoms in relation to Modern Diagnosis and Treatment* By ROBERT JOHN STEWART McDOWALL, DSc, MB, F.R.C.P.E. London: William Heinemann (Medical Books), Ltd, 1931 Pp viii and 440 Price 21s

PROFESSOR McDOWALL has chosen a very apt title for this book—"The Science of Signs and Symptoms," which is based on his earlier publication "Clinical Physiology." There can be little question as to the need for a work of this kind as it contains matter which cannot be adequately dealt with even in the larger textbooks of medicine without unduly increasing their bulk, and also the results of modern research work which are not readily obtainable by the practitioner and student. For both classes of readers it should prove of great value as it contains much interesting matter expressed in a concise and lucid manner. Sections of the book which would call for special commendation are those dealing with the nervous system and respiration and that on exercise and rest. The bibliography is extensive, but we would suggest that in a future edition the references, especially to the journals, should be given fully with the page number. There can be little doubt that this book will meet with the warm reception it thoroughly merits.

*Clinical Atlas of Blood Diseases* By A. PINEY, M.D., M.R.C.P. and STANLEY WYARD, M.D., M.R.C.P. Second edition. London: J. and A. Churchill, 1932. Pp. xvi and 105. Plates 38, 34 in colour. Price 12s 6d.

It is not surprising that within less than two years a second edition of this extremely useful handbook should appear, which at a glance tells more than much poring over an explanatory printed statement as to changes in the blood pictures. The authors have added two more coloured plates, one of which shows the appearance of the blood in sickle-cell anaemia, the other in acute lymphatic leukaemia.

*Royal Berkshire Hospital Reports, Reading, 1932* Edited by H. S. LE MARQUAND, M.D., M.R.C.P. Pp. 159. Figs. 21. Price 10s 6d. Copies to be obtained from the Secretary of the Hospital.

THE staff of the Royal Berkshire Hospital must be congratulated on their energy in bringing out a well got-up volume containing seventeen articles which record with commentaries a number of interesting cases. Much of the material has been brought before the Reading Pathological Society, which dates back to 1841, and so is the oldest in this country. Its history was written up to 1909 by the late J. B. Hurry, President in that year, and these *Reports* will now take up the record of its proceedings for the future. Among the articles special reference should be made to that by Dr. Paul Cave on osteoplastic metastases in prostatic carcinoma, in which the bone becomes sclerosed instead of softened by the secondary growths. Mr. J. L. Joyce gives an interesting account of diverticulitis of the colon based on 35 cases, 25 of which were operated upon. Dr. Mills writes on glandular fever and the adrenal function, Mr. E. A. Dorrell reports three interesting ophthalmic cases, and the editor writes on pernicious anaemia in the aged, recording a case in a woman aged 79 years.

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- BENSON, V C, M.R.C.S., L.R.C.P. Lond.**, appointed Assistant Medical Officer, Grove Park Hospital, London County Council.
- BRISTOW, W ROWLEY, F.R.C.S.**, appointed Orthopaedic Consultant, King Edward VII's Convalescent Home for Officers, Osborne.
- CARROLL, J V, M.B., B Ch. Dubl., D.P.H.**, appointed Assistant Medical Officer, Grove Park Hospital, London County Council.
- CRISP, Thomas, M.D., Ch.B.**, appointed Medical Referee under the Workmen's Compensation Act, 1925, for the districts of Chorley, Lancaster and Preston County Courts (Circuit No 4)
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- EVANS, T J, M.B., B Ch., D.P.H.**, appointed Assistant Medical Officer, St. Luke's, London County Council.
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- STROM-OLSEN, ROLF, M.B., B.Ch., D.P.M.**, appointed Senior Assistant Medical Officer, Cardiff City Mental Hospital, Whitchurch, near Cardiff
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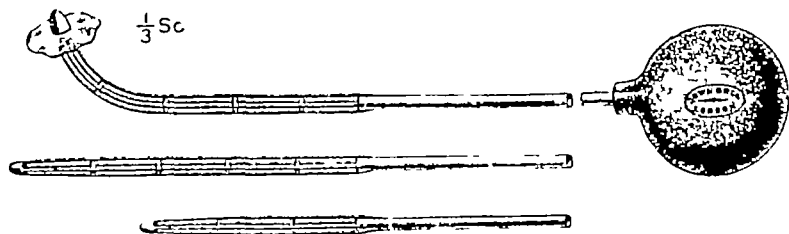
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*Etude experimentale du Bismuth lipo-soluble*, par M C Levaditi en collaboration avec M V. Sanchis-Bayarri et Mlle R Schoen (pour la partie experimentale et histologique), Mlle Y Mannin (pour la partie chimico-analytique)

*Traitement de la Syphilis par le Bismuth lipo soluble*, par MM L Fournier L Guenot, Schwartz and Yovanovitch

"Les Bismuths Lipo solubles," par Rene Mignot, *La Presse Medicale*, No 95 (27th Nov 1929)

"The treatment of Yaws with 'Bivatol' in Benin, Nigeria," *West African Medical Journal* (Jan 1930)

"Therapeutic Evaluation in the Treatment of Syphilis," *British Medical Journal* (21st Feb 1931)

"Le traitement d'attaque de la Syphilis par le Bismuth lipo-soluble," *La Presse Medicale*, No 44 (3rd June 1931)

'The possibilities of Bismuth Therapy in the treatment of cutaneous diseases,' *The British Journal of Dermatology and Syphilis* (Nov 1931)

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Original articles, clinical lectures, medical society addresses, and interesting cases are invited, but are accepted only upon the distinct understanding that they are published exclusively in THE PRACTITIONER. Unaccepted MS will always be returned.

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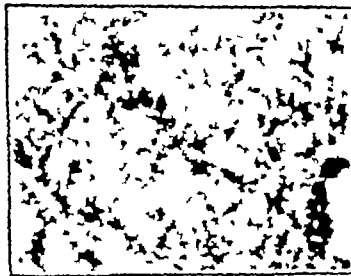
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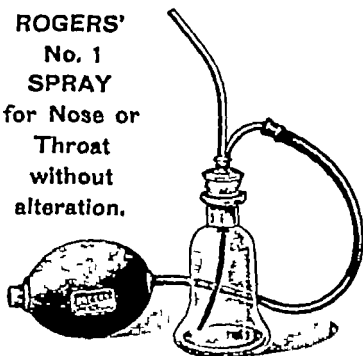
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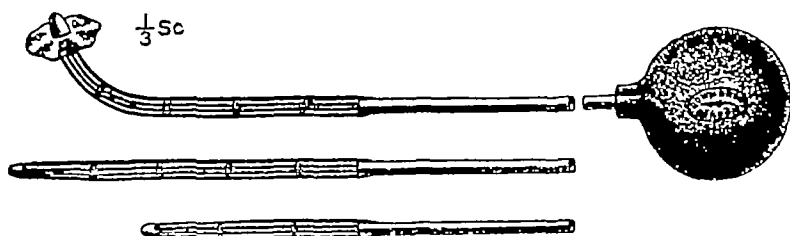
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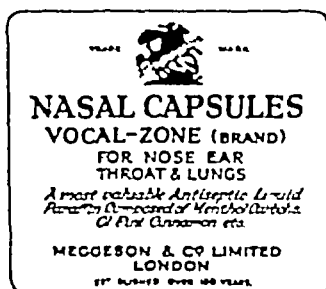
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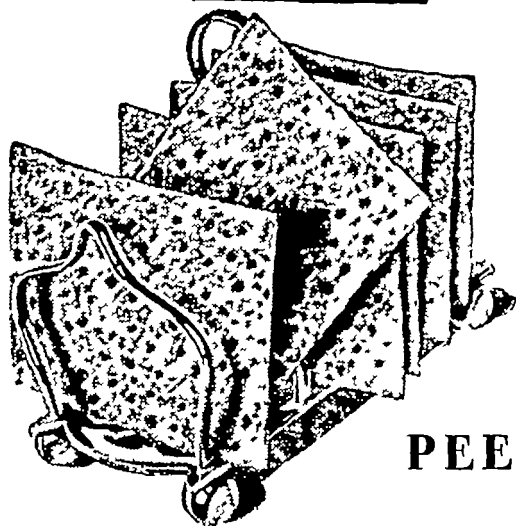
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*Traitement de la Syphilis par le Bismuth lipo soluble*, par MM. L. Fournier, L. Guenot, Schwartz and Yovanovitch

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'Le traitement d'attaque de la Syphilis par le Bismuth lipo-soluble' *La Presse Medicale*, No 44 (3rd June 1931)

"The possibilities of Bismuth Therapy in the treatment of cutaneous diseases," *The British Journal of Dermatology and Syphilis* (Nov. 1931)

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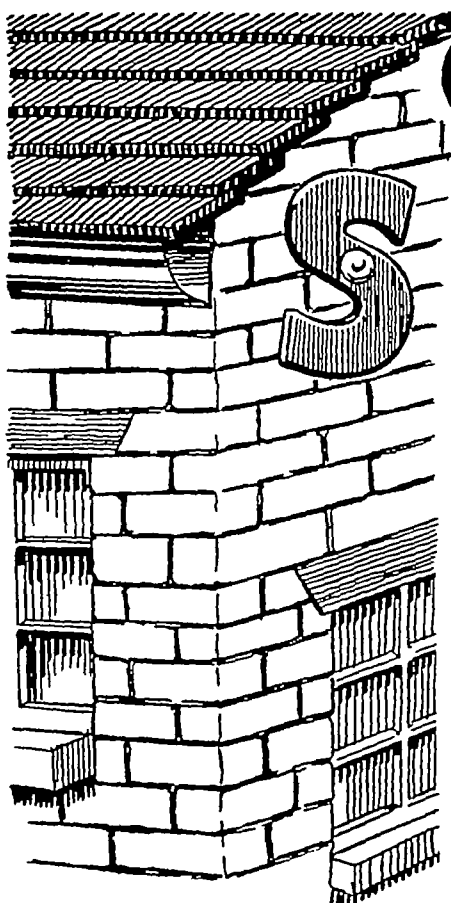
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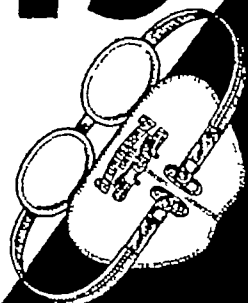
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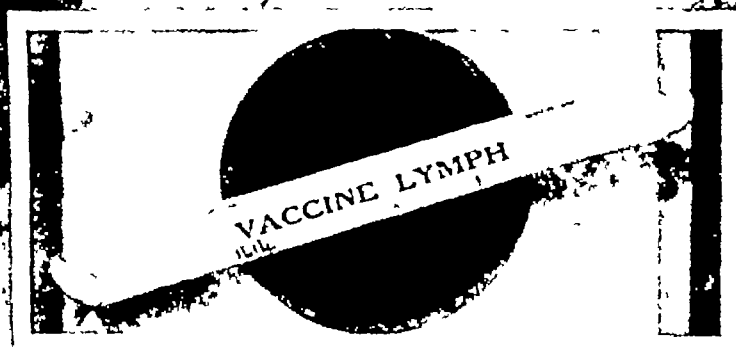
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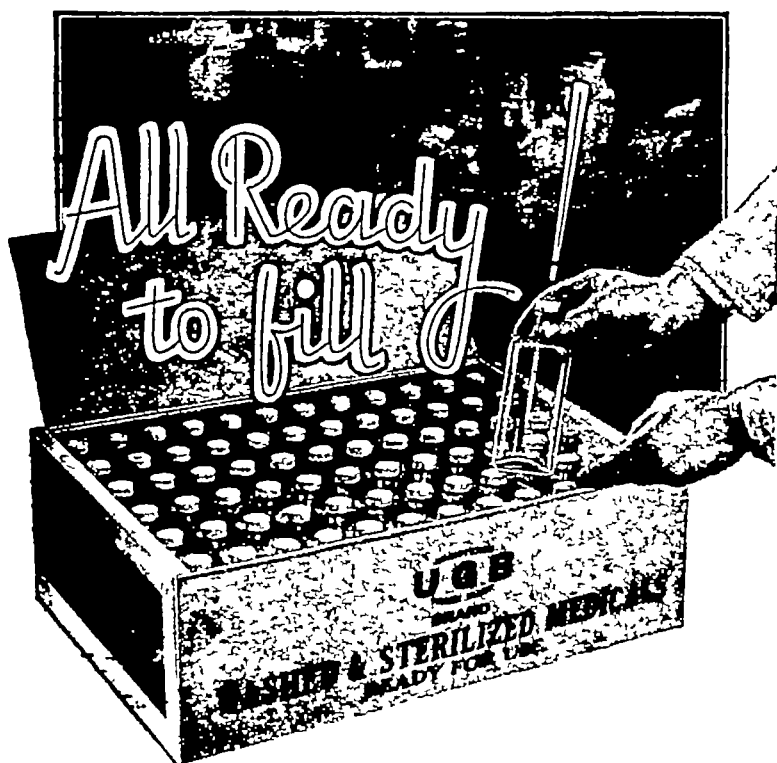
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(2) *Buergi (Berne University)* *Therapeut. Monats.* Nos. 1 and 2—*Deut. Med. Wochens.* No. 35—*Schweiz. Rundschau f. Med.* No. 14.

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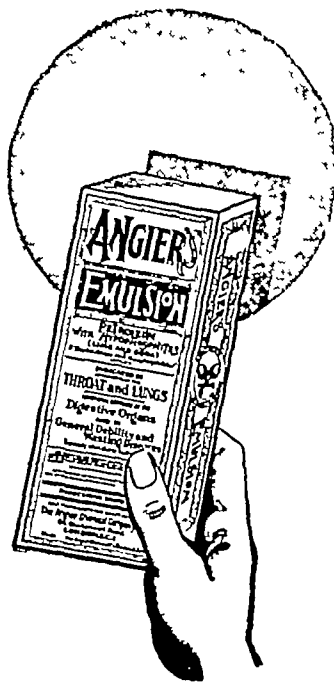


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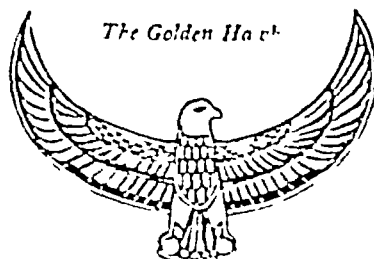
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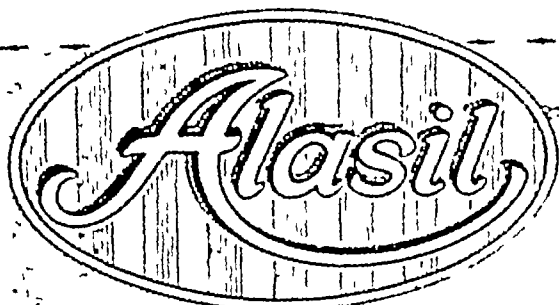


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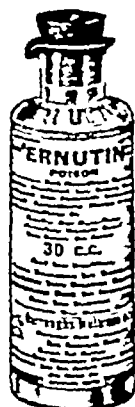
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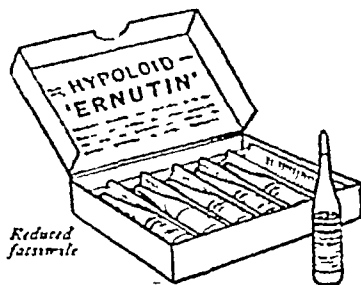
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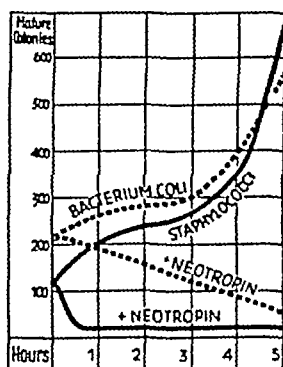
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# THE PRACTITIONER

No. 766

APRIL, 1932

Vol CXXVIII

## British Health Resorts and Spas

By SIR HUMPHRY ROLLISTON, BART, G C V O,  
K C B, M D, Hon D Sc

*Regius Professor of Physic in the University of Cambridge,  
Physician in Ordinary to H M the King, sometime President of the  
Royal College of Physicians*

WITH the general and special advances in the art of healing—for Medicine, even with a capital M, might not convey to every one that it includes the brilliant results of the revolution in surgery—there has been a welcome tendency to utilize Nature's own methods of preventing and curing disease and to advocate the expansion on modern scientific lines of the practice of the ancient Greeks and Romans. Prominent among these is the cult of pure air and water, as the title of the frequently quoted but less often read Hippocratic treatise "Airs, Waters and Places" may remind us. The history of hydrology and climatology is long, interesting, and in some ways repeats itself, thus in the summer of 1641 the respective merits of British and Continental waters became a burning, though it is true a political, question. No attempt will be made here to analyse its passing phases, but those interested in the subject as regards this country might spend a pleasant hour in reading the article on "Watering Places" in the recent *Englishmen at Rest and Play, some Phases of English Leisure 1558-1714* by Members of Wadham College, Oxford. An irresponsible writer on this extensive subject may

well recall, with some uneasiness on account of the warning conveyed in the middle of its title, a paper published in 1894, "Places and *Commonplaces* in chronic renal disease." The author of that article, the late W. H. Dickinson, a medical Samuel Johnson, took an active part, together with the late W. M. Ord, in bringing out, under the auspices of the Royal Medical and Chirurgical Society, which became, in 1907, the parent of the present Royal Society of Medicine, two authoritative reports on the Climatology and Balneology of Great Britain and Ireland in the late nineties of the last century.

As one of the many remedies for the present economic crisis a move is being made to restrict our exports, much greater than our imports, of tourists, and so to retain in this country as much as possible of the thirty million pounds of British money which, from calculations based on the year 1928, is thus annually spent abroad. This "stay in Britain" movement has recently been directed to encourage wintering in England, especially on the south and south-west coasts and the Cornish Riviera. Historically it is only right and proper that the seaside treatment should be fully recognized and practised in this country, that of its birth; for in 1750 an Englishman, Richard Russell (1687-1759), F.R.S., a medical man of Lewes in Sussex and the real founder of Brighton as a health resort, was the first to recommend the use of sea-water for the cure of enlarged lymphatic glands. Though largely forgotten in his own country he has recently been hailed as "the father of marine treatment" or thalasso-therapy, by Dr. C. Haberlin, physician to the Marine Hospital, Wyk-auf-Fohr, near Helgoland, who regards "sea climate as more effective, *cito, tuto et jucunde* than other forms of treatment." Russell's lead was followed in July, 1791, by the establishment of "The Margate Infirmary for the Relief of the Poor whose Diseases require Sea-Bathing," which,

in 1898, changed its name to The Royal Sea-Bathing Hospital. The founder was the famous John Coakley Lettison, who was the moving spirit in starting many important and charitable institutions, such as the present Medical Society of London, the Royal Humane Society, and the General Dispensary in Aldersgate Street—the first of its kind in London.

That the benefit resulting from visits to health resorts and spas is due to various factors, according to the circumstances of the visitors and of the locality, is a commonplace. With regard to the limitations of the value of change and of the special factors conducive to improvement characterizing health resorts and spas, it is obvious that, in advising a patient to undergo this form of treatment, consideration must be directed to the special requirements of the individual and to the suitability of the health resort. Change of environment alone may be beneficial in certain but not in all circumstances. Relief from the worries incidental to ordinary life and wise medical supervision may certainly play a part, but banishment from the comforts of home and the resulting boredom and discontent may go far to neutralize this benefit. Change of scene does not necessarily alter the mental and physical horizon, especially in grave disease. William Heberden, the author of the now forgotten "Commentaries on the History and Cure of Diseases" (1801), brought a strong indictment against the abuse of change *per se* in an article on the hectic fever published in 1772: "In lingering illnesses where all other means have proved ineffectual a journey to — is usually proposed by the friends and wished for by the sick; but besides the fatigue and many inconveniences of a journey to a dying person, the — waters are peculiarly hurtful to this fever which they never fail to increase and thereby aggravate the sufferings, and hasten the death of the patient."

These are no doubt extreme cases, but there are

many more examples in which little or no good results from a change because the patient is not for one reason or another in harmony with his new surroundings. Every effort therefore must obviously be made to ensure that the patient's state is likely to benefit from treatment away from home and that he should go to a health resort specially adapted to meet his requirements. A medical man can advise his patient much more satisfactorily and with conscious confidence if he has been to the health resort and so knows its equipment, qualities, hotels, and the general atmosphere. Not only are the physical characters of the water, the altitude, rainfall, humidity, temperature, sunshine, prevalent winds and so forth important, but the arrangements and amenities for the comfort, amusement, and distraction of patients are essential for the success of a spa. Though medical men are not responsible for these attractions, they are bound to take them into due consideration in recommending a spa or health resort, and thus can indirectly, if not in other ways, guide and stimulate the municipal authorities at spas and health resorts to be constantly on the alert to improve in every possible way the resources of the areas under their care and control.

In this number of *THE PRACTITIONER* there are published two comprehensive articles on the British spas, followed by three articles on the health resorts of the west and south-west country, and south and south-east coasts, and the east coast respectively. The authors have discussed the various spas and health resorts in such a way as to be genuinely helpful to the practitioner who has to choose the spa treatment or climate most suitable for the individual patient who consults him.

# The British Spas: Indications and Seasons

By R. FORTESCUE FOX, M.D., F.R.C.P.

*Président de la Ligue internationale contre le Rhumatisme ,  
Editor of " Archives of Medical Hydrology "*

THE British spas have a family resemblance impressed upon them by the influence of a northern and island climate. This species of climate gives them, especially those towards the North Sea, a specific medical value different from that of other European spas, such as those of Central France, of the Pyrenees, the Rhine Valley or Switzerland. The summer in Britain is considerably cooler than at the Continental spas, excepting those in the Alps. Harrogate (altitude 500 ft) has the same temperature as the Italian Bormio (4,500 ft), Strathpeffer (200 ft, 4° cooler than Harrogate) corresponds to the Swiss Leukerbad (4,600 ft.) At the warmest British spas, Bath and Cheltenham, the summer readings are the same as those of Karlsbad (1,230 ft) and Aachen (530 ft). With this temperate quality of the summer season, and its long northern days, is combined an almost incessant movement of the air and a relative increase of moisture, which give a certain freshness to the British climate. The further south one goes, the higher is the altitude at which the same tonic quality in the air is found, consequently the northern British moorlands, and especially the dry and bracing north-easterly part of Scotland, are medically a good alternative to Switzerland. It is important to remember that the influence of climate, like that of altitude, profoundly modifies the action of baths, the same bath produces different effects at a Rhine spa and in the Scottish Highlands. The reaction of invalids to spa treatment in the fresh and tonic airs

—the acquired and the inherited—often showed this difference. To-day there are still two types of most chronic diseases, rheumatic, digestive, circulatory, even nervous. These two common phases of disease are clinically obvious as *congestive* and *chilly* states. In terms of metabolism, they might for convenience be described as high and low tide, or exaggerated and subnormal.

Two types of spa treatment are, as Edgecombe<sup>2</sup> has pointed out, appropriate to these two types of cases. For the congestive type a catabolic treatment—increased elimination by the bowels, kidneys and skin, with appropriate diet and exercise; for the subnormal type, an anabolic treatment—building up and invigorating by suitable tonic waters, baths and regimen.

#### SPECIAL INDICATIONS

*Rheumatic diseases*—Many painful conditions of the joints and soft parts, at present called “rheumatic,” develop in middle life (in men as well as women), such as climacteric arthritis, sciatica, lumbago, and fibrositis. For patients of a stout and congestive habit, a combination of saline waters and external treatment may be given at Harrogate or Cheltenham. These waters greatly increase elimination, and a course of intensive thermal treatment stimulates catabolism and the circulation and skin. The same combination of remedies has been used for many years in congestive gout. On the other hand, thin and delicate subjects are better treated by the diuretic pure sulphur waters of Strathpeffer or Llandrindod Wells. The temporary exacerbation of pain and swelling in both rheumatic and gouty persons drinking sulphur waters is a curious and suggestive observation. For arthritis in debilitated, anæmic subjects either sulphur or iron waters are given. Thermal treatment at medium temperatures is generally well borne, as at Buxton and Strathpeffer, as well as cutaneous stimulation by aeration and douche.

baths, or the powerful acid baths of Trefriw. The brine baths of Droitwich have proved useful in convalescence from septic arthritis. Sciatica, lumbago and fibrositis often yield to brine baths, with or without fango packs, as at Woodhall Spa. Skilled manipulation, combined with heat and moisture in douches and pools, is well done at Bath and Buxton, and remains the premier form of external treatment for rheumatic diseases, both of the joints and soft parts.

Much depends on the form of the disease and the stage at which it comes under treatment. The very serious and crippling generalized progressive arthritis of young women has sometimes, in the writer's observation, been checked at or near the onset by very brief hyperthermal baths, commencing at 108—110°F., for 1—2 minutes' duration, and increasing in temperature by 1°F every day up to the limits of toleration. The intention is strong stimulation of both circulation and peripheral nerve-endings, with increased oxidation. This form of arthritis with the profound constitutional disturbance that accompanies it, shown by anæmia, pigmentation, amenorrhœa, defective peripheral circulation and muscular wasting, sometimes yields to an intensive thermal cure, accompanied, of course, by a stimulating regimen, frictions, generous diet and much fresh air. Spas in a dry, moorland air are most suitable for such cases. As a rule, in the inflammatory stages of arthritis only sedative baths without movements or massage can be given.

In the later stages of arthritis, when the inflammatory reaction has subsided, stiffness and muscular wasting can be combated and the motor function re-educated by pool baths and manipulation. Prolonged baths are used with advantage on the Continent. A continuation of thermal impressions for some hours in warm surroundings, as in many forms of "combined treatment," has much to recommend it in chilly rheumatic subjects. After prolonged immersion it is



often possible to obtain good movement of a stiff joint and use deep manipulation without pain. For in the pool muscular spasm is relaxed, the circulation increased, and the nerve endings subjected to a single massive sedative impression. Painless movement may also be secured by whirlpool and other local baths.

Osteo-arthritis of the hip or shoulder-joints, with pain and defective movement, may also be relieved by pool baths at proper temperatures and by peat or fango packs locally applied, as at Woodhall Spa.

*Neuroses and psychoses.*—Sedative, long-continued baths at the spas are helpful in all conditions of chronic neuro-vascular irritability. Spare, restless, anxious, delicate neurasthenics are benefited at Llandrindod Wells and Strathpeffer, but the cure and after-cure should occupy at least six weeks. Sluggish, stout, congestive neurasthenics should, on the other hand, be referred to the eliminative spas—Harrogate or Leamington, or Buxton when diuresis is indicated.

Tonic baths and douches arouse and stimulate the entire nervous system. To particularize, atonic hypochondrias and neurasthenias are greatly helped by contrast douches, best of all before breakfast, combined often with vigorous manipulation. The results of organic disease (local paralyses, ataxia) may be largely overcome by long-continued pool baths and re-education movements, practised with excellent effect at Bath and Droitwich, also at Cheltenham. Neuritis can be treated by local vapour baths, pack and peat baths. A few years ago excellent results were reported in migraines and neuralgias by cold or contrast spinal douches, also from cold sitz baths, and, in cases of poor circulation, by very hot foot baths. Insomnia may be successfully dealt with by sedative pool baths.

*Circulatory disorders.*—Eliminative waters are occasionally useful, but the great part played by the spa in circulatory disorders lies in the skilful use of external treatment. Effervescent baths profoundly modify

arterial tension and the force and frequency of the heart beat. The higher scale of temperature (98°F.) is used in hypertension, the lower scale (90°F.) in hypotension. For myocardial weakness such baths have for many years been used with excellent effect in middle life and in the condition which sometimes follows acute disease (Rovat, Nauheim). For the sequelæ of rheumatic fever, both unresolved arthritis and endocarditis, good results have been reported after the acute stages have subsided from a gentle course of sulphur waters and baths. Both the rheumatic and the cardiac condition often markedly improve. The same condition was first treated by the manipulation douche at very low pressure, at Aix-les-Bains and later at Strathpeffer. Similar treatment is available in winter at Bath and Droitwich. Carefully regulated manipulation douches and effervescent baths could be given at any spa, together with the *terrain cure* (graduated exercises), which is a valuable adjunct in such cases. At present, however, the cardio-vascular specialty has not been developed in connection with an English health resort. Exophthalmic goitre may here be mentioned, since motor atony and tachycardia may be greatly helped by bathing on a declining scale of temperature. Treatment by baths has been favourably reported on in cases of auricular fibrillation (H. E. Rhodes<sup>3</sup>). In accordance with the principles first noted, all associated digestive or toxic disorders should be treated by waters or other appropriate means concurrently with the baths.

What applies to all types of disorders applies specially to cardio-vascular diseases, that the climate in which baths are given is of prime importance, and, in fact, may determine a favourable or an unfavourable reaction. Many health resorts are enervating for persons who require an invigorating air. In the same way a bracing place may be exciting and definitely injurious for sensitive persons who require a soft and sedative

air. These states of sensitiveness are common to many conditions of ill-health and may be expressed perhaps as a difference of tension, mental and physical. It is noteworthy that different states of sensitiveness or tension are found amenable to external physical impressions. For cardio-vascular cases the British climate provides a sufficient and useful range of sedative and stimulant impressions of this kind.

*Digestive disorders* — Chronic catarrhs of the gastro-intestinal tract and gall-bladder, although like all catarrhs probably infective, are often cured by waters which remove unhealthy products and favourably modify the mucous membrane.

The action of the various types of British waters is summarized by Worthington<sup>4</sup> as follows :—

(1) *Simple thermal waters* (Bath, Buxton) are soothing and sedative and reduce peristalsis (Cold water increases peristalsis) (2) *Saline or "muriated" waters* (Llandrindod, Cheltenham, Leamington, Bridge of Allan) increase gastric tone and stimulate motility and secretion. The mild or isotonic waters wash out the stomach and duodenum, the stronger waters are definitely aperient. (3) *Sulphur waters* (Harrogate, Strathpeffer, Llandrindod Wells, Llanwrtyd) increase the secretions and are distinctly diuretic. When highly mineralized they are aperient. (4) *Alkaline waters* (Cheltenham only in this country) in small doses stimulate gastric secretion, in large doses they reduce secretion and peristalsis, but stimulate the liver and flow of bile. (5) *Chalybeate waters* (Cheltenham, Harrogate, Llandrindod Wells, Trefriw), especially when saline, are tonic, they increase the resistance of the body and are useful in after-treatment.

Worthington also remarks —

At Llandrindod for generations the Welsh farmer class has been in the habit of taking the nearly isotonic waters in very large quantities on an empty stomach, drinking glass after glass at short intervals to a total amount of from three to six pints or more before breakfast. Taken in this way, and even in considerably smaller quantities, these waters act as a complete gastro-intestinal lavage, washing the digestive tract from beginning to end.

Such a regimen, carried on for a period of weeks, especially if combined with partial fasting, is particularly appropriate in cases of intestinal toxæmia, in which a cleansing of the whole intestinal tract is required, as well as for localized catarrhs of the colon.

("colitis") Indeed it is often more effective than any form of colon lavage

Congestive dyspepsias with hyperacidity and constipation and perhaps some enlargement of the liver, including many cases from tropical countries, are well treated by eliminative sulphur waters at Harrogate, and sometimes by the alkaline saline water at Cheltenham. Catarrh with hypo-acidity often yields to mild saline waters, especially mild and easily digested salt waters, which stimulate gastric secretion and tone, as at Bridge of Allan and Llandrindod. Anæmic dyspeptics obtain benefit from chalybeate waters, especially in tonic air, as at Strathpeffer and Buxton, or from minimum doses of the very powerful acid ferrous sulphate water of Trefriw. It is remarkable how great an increase of appetite is observed when waters are taken in repeated doses fasting in the early morning with gentle exercise. But since it is the case that dyspepsia may be an effect or a cause of associated conditions (a fruit or a root), a spa should be selected for each patient, at which the whole condition may be adequately treated.

The spas are not suitable for the acute, inflammatory or febrile phases of disease, but they can do much for disordered health, which is the early stage of disease, and much also for the results of inflammatory processes. The British spas are of great value for many forms of "breakdown," provided that the diagnosis is made and treatment instituted in the early stage of defective or exaggerated function.

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# The Choice of a Spa

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SOME scheme of classification of the various spas in this country is essential, so that by a comparison of the facilities available, a satisfactory selection may be made, with due regard to the requirements of the particular case in view. There are several bases on which such a classification may be founded; for example, spas may be grouped according to their climatological aspects or classified in accordance with the character of their waters. The latter would include their chemical nature, expressed either in ionic concentration, or in relation to their saline contents (sodium chloride, sodium sulphate) or by their physical properties (temperature, radio-activity or tonicity). From the prescriber's point of view, probably the most convenient basis for classification is that of their medicinal properties.

In adopting this classification as a basis for selection, care must be taken not to push it too far, otherwise one falls into an error very common in the older spa literature. For instance, an old guide-book to one of the English spas states that its water is pronounced a cure for asthma, dropsy, scrofula, itch, gout, rheumatism, diabetes, "green sickness," hiccups, tumours and worms. It no doubt was and is of benefit in "green sickness," now much rarer than formerly. It is more than likely that rival spas made similar claims, so that the task of selection was easy or difficult according to the view taken of that spa in particular or of the others in general.

The eleven principal spas of this country belong to the British Spa Federation, membership of which is confined entirely to those resorts attaining a certain

standard in the quality of their mineral waters, the facilities provided for their administration (both internally and externally), the accommodation available for visitors and suitable amenities for their entertainment. In alphabetical order the spas are: Bath, Bridge of Allan, Buxton, Cheltenham, Droitwich, Harrogate, Leamington Spa, Llandrindod Wells, Strathpeffer, Trefriw, Woodhall Spa.

In the following brief notes, arranged in alphabetical order, regarding the disorders amenable to spa treatment; under each heading, the name of the spa considered most suitable for that particular condition is given.

#### PRINCIPAL DISORDERS AMENABLE TO SPA TREATMENT IN GREAT BRITAIN

*Anæmia.*—The waters of Trefriw Wells are among the most concentrated iron waters known, the iron concentration being 80 in 100,000, whereas other chalybeate waters rarely exceed 6. The dose is remarkably small—a tablespoonful. Most anæmias can be treated with Trefriw water. A combination of the waters and baths has proved successful in cases of neuritis and neuralgia when some degree of anæmia is present.

*Cardio-vascular disorders.*—Spa treatment is not indicated in organic heart disease. Suitable cases are: Debility of heart muscle due to overwork; mental strain, and after protracted illness; nervous hearts with simple tachycardia; disordered action of the heart with effort syndrome; and paroxysmal tachycardia when caused by intestinal toxæmia. Leamington water is mildly aperient, producing liquid stools, thus aiding the elimination of toxins due to constipation. Baths artificially aerated are available and are given combined with resistance exercises for toning up the cardiac muscle.

It should be noted that there are no natural CO<sub>2</sub>

springs in this country.

*Circulatory disorders* —The eliminatory properties of the Leamington water are seen to their best advantage in the treatment of hyperpiesis when due to the presence, in the circulation, of the toxic bye-products of metabolism. There is considerable evidence that when the lower bowel is functioning normally these substances are not formed. Rhodes states that 80 per cent of patients with hypertension have an abnormal amount of mucus in the stools, which indicates intestinal catarrh. The judicious combination of baths and waters meets the chief indications in the treatment of high blood pressure, toxins are eliminated, the peripheral vessels dilated, arterial spasm reduced and the function of the alimentary tract improved. The diet is also regulated and the exact amount of exercise specified.

*Constipation.*—Harrogate Old Sulphur Water is especially indicated in the treatment of both colonic constipation and dyschezia. In the former it acts as a powerful stimulant to the liver and by increasing the flow of bile provides a natural purgative. In the latter, it provokes a fluid evacuation which effectually washes out the whole of the lower bowel. While the water is being taken there is an increase in the volume and weight of the fæces amounting to nearly 250 per cent.

*Gastro-intestinal catarrh* —At Cheltenham, the Pittville spring is mainly prescribed for gastric catarrh. This spring is the sole representative in this country of the alkaline bicarbonated waters found abroad at Vichy, Carlsbad, and Marienbad. It acts as a mild antacid and diuretic on account of its hypotonic properties, and is extensively used in the treatment of gastric and duodenal catarrh. It has been found valuable in cholelithiasis and biliary catarrh, but its chologogic action is not so strong as that of the Harrogate water. It is recommended in hepatic insufficiency.

after long residence in the tropics. The "twin salt" or Fieldholme water is said to contain nearly equal parts of sodium sulphate and magnesium sulphate. Being hypertonic and aperient in its action, it has a "derivative" effect on the entire alimentary tract and thus exerts a general cleansing action on the intestines. It is much used in gastric hyperacidity and chronic constipation. Like the Lammington water, it is indicated in cases of high blood pressure due to the circulation of toxins resulting from defective elimination. The sodium sulphate or Lansdown water contains, besides the ions of sodium, chloride and sulphate, those of calcium, iron, and carbonate. In the combination of iron and carbonate ions, it bears some resemblance to the water of Kissingen. Being a saline water it is not constipating and may be employed with advantage in the treatment of dyspepsia when accompanied by anaemia.

*Gout*—Acute gout with its sudden onset, involving mostly the proximal phalangeal joint of the great toe and characterized by its red swollen shiny appearance with great tenderness is now comparatively rare. Chronic gout, both articular and abarticular, derives considerable benefit from spa treatment, because by the use of aperient and diuretic waters the uric acid can be kept in solution. It must, however, be recognized that spa treatment is very liable to precipitate an attack which need not necessarily involve the great toe joint. After the attack has passed off the blood is temporarily freed from uric acid and the patient feels uncommonly well.

In chronic articular gout the subacute attacks become more frequent and the patient is rarely free from some joint pain and disability. The articulations become deformed and creak on movement. Peri-articular tophi form slightly movable swellings in the neighbourhood of the joints and masses of the same nature are to be found on the helix of the ear and over the extensor



surface of the forearm. Bath possesses the only natural hot water in this country. Its temperature at the source is about 120° F. Being of extremely low mineralization, it has a special indication in the treatment of chronic gout, as it is hypotonic, when taken internally, and thus readily absorbed from the intestine and excreted by the kidneys. It thus exerts a cleansing and flushing effect on the entire circulatory system. The water is employed externally as baths or douches alone, or combined with massage. By these means, the excretory functions of the skin are stimulated, stiffened joints are mobilized and gouty effusions are dispersed.

What is termed "irregular gout" is often seen in plethoric individuals and is frequently associated with dyspepsia, gastro-intestinal catarrh and sometimes with constipation. Pharyngitis, iritis, and conjunctivitis as well as eczema and various other manifestations of defective elimination are also observed. Sulphurated saline water and the radium sulphur of Llandrindod Wells are extensively used in the treatment of these conditions. The waters are mostly employed internally. The first named, being slightly hypertonic and therefore aperient, exerts a flushing and cleansing action on the gastric and intestinal mucous membrane. The latter is described as a powerful metabolic stimulant, possibly due to its radio-active properties. Both are strongly diuretic and this combined effect meets the main indications for the treatment of the various gouty manifestations.

*Gouty glycosuria* is common in fat plethoric subjects. There are no diabetic symptoms such as thirst, polyuria, emaciation and weakness. It is often due to a lowered renal threshold. Maximum ingestion level may be 0.3 per cent below normal. In many instances after a week or two of the Harrogate magnesia water, sugar has been found to disappear entirely from the urine. How far this is due to the restriction of diet and how far to the water is a matter for conjecture. Control

experiments would appear to favour the view that the water has a beneficial effect. The old sulphur water is usually given along with the magnesia and its well-known action in the reduction of weight may be a contributory factor.

*Gouty skin diseases* —The sulphur water used in the baths at Strathpeffer has a very high content of sulphurated hydrogen. No. 4 (Cromartie spring) has as much as 23 inches to the gallon. As this gas is one of the few constituents of a mineral water that is known to be absorbed, its efficacy in the treatment of skin diseases is obvious. Moreover sodium chloride, which is very irritating to sensitive skins, is almost entirely absent. Taken internally the waters are diuretic, in addition to which they act as an intestinal disinfectant due to the presence of  $H_2S$ . There is also an iron water at Strathpeffer which is often ordered as a general tonic after the sulphur "cure."

*Liver disorders*.—Established organic disease of the liver is not likely to obtain much benefit from spa treatment. It is mainly in the early or "functional" stages that good can be done. If the liver cells are flooded by toxic material they are unable to eliminate the bye-products of metabolism. Owing to the anabolic functions of the body being in the ascendant with regard to its katabolic activity there may be a deposition of fat in the liver cells. The Old Sulphur water at Harrogate appears to have almost a specific action as a hepatic stimulant. Experiments by Bam and others have conclusively shown that during its administration there is a marked increase in the excretion of bile and bile solids. There is therefore a clear indication for its use in the conditions mentioned above with, in addition, that of cholelithiasis. In many respects the action of the Harrogate water resembles that of Carlsbad and is employed in much the same conditions.

*Nervous disorders* —In organic diseases, such as paralysis accompanied by muscular spasm, the pool

bath at Cheltenham at a temperature of about 100° F. is employed. The water buoys up the limbs and partially removes the effect of gravity. In consequence movements are more freely performed. The heat of the water relieves muscular spasm, contraction or hypertonus. Further than this, the general nutrition is improved by the warmth. In psychasthenic states accompanied by mental irritation the prolonged sedative pool is of undoubted value. Its duration may be several hours and the temperature is maintained at about 95° F. The absence of numerous cutaneous stimuli and the warmth of the bath has a distinctly soothing effect on the peripheral nervous system. Apart from hydrological methods of treatment, Cheltenham is a quiet restful town and well adapted to the needs of those requiring change of scene and surroundings.

*Obesity.*—As obesity is due either to an excessive intake of food or a deficiency of oxygen to burn it, the cause must often be sought for in some endocrine disturbance. The treatment is mainly dietetic but a "cure" at a suitable spa is often helpful. The type of case which chiefly benefits from such treatment is that of the middle-aged, over-fed, under-exercised, self-indulgent patient. One of the advantages of the Harrogate Old Sulphur water is that its good effects in correcting metabolic errors are attainable without any extensive limitation of the diet, a circumstance naturally very attractive to the class of individual just mentioned.

*Pelvic disorders*—Woodhall Spa water, in addition to the usual salines, contains ions of bromine and iodine. It thus belongs to a group of waters represented abroad by those of Kreuznach, Kissingen and Hall (Austria). Taken internally, it stimulates the hepatic function and acts as a moderate purgative. There are as well the special indications associated with its bromine and iodine content. For external use, a specially concentrated form of the mineral water

known as the "Motherlye" is prepared by evaporation. This is added to the water used for vaginal douches in the treatment of leucorrhœa, vaginitis and congestion of the uterus and adnexa. Its value in this relation is greatly enhanced when combined with immersion baths of the natural mineral water.

*Renal disorders.*—Organic disease of the kidney contra-indicates spa treatment as if the damaged organ cannot excrete the additional water, it is only stored in the tissues. If functional activity is unimpaired a suitable mineral water such as that of Llandrindod will flush out the kidneys and thus get rid of the additional waste products produced by the various external treatments, such as baths and massage. It is also of value in nephrolithiasis in gouty plethoric individuals. It has been used with advantage in bacterial affections of the kidney and pelvis.

*Respiratory diseases*—In addition to the drinking of Woodhall Spa iodo-bromated water, local treatment in the form of sprays for chronic naso-pharyngeal catarrh, chronic follicular tonsillitis and laryngeal irritation associated with functional dyspepsia and constipation, is available at this spa. Being situated in the midst of pine woods the scent of the pine proves most beneficial in many respiratory affections. Asthma, especially when associated with abnormal protein sensitivity and reflex irritation of the vagus, is not suitable for spa treatment, at any rate so far as this country is concerned.

Taking them as a whole, the treatment of respiratory conditions is not particularly well catered for in Great Britain.

*Rheumatic diseases*—Spa treatment is chiefly of value in the more chronic forms of the disease. The skin reactions of the "pre-rheumatic child" may be improved by the use of alternating hot and tepid baths. As non-articular rheumatism is largely associated with a defective skin reaction, the profuse perspiration

provoked by the brine baths of Droitwich is of great value. It should, however, be thoroughly realized that no spa treatment is of any avail so long as a focus of infection remains untreated. In the earlier stages of a muscular or neuro-fibrositis sedative measures are required. Later, with the definite formation of painful nodules more energetic methods are necessary. These will include hot immersion baths with packs and hot douches with or without massage.

*Articular rheumatism.*—As there are various types of this affection, the spas best suited for them are mentioned separately. As *rheumatoid arthritis* is a peri-arthritis, possibly a tropho-neurosis, and not as a rule associated with any known organism, measures should be taken to improve the general health and combat the profound metabolic upset. It is in the prodromal stage of this condition—numbness and tingling of the hands and fingers with trophic changes—that most good can be done. Buxton possesses the largest spa hospital in the country and is firmly established in the popular mind as the spa for the treatment of rheumatism. The natural mineral water is tepid at its source, highly radio-active and only slightly mineralized. Taken internally it is strongly diuretic but not purgative. The water is used externally to supply bathing pools in which the patients can move about and freely exercise their joints. A special form of massage douche has also been instituted known as the Buxton massage douche which is of the greatest value in the treatment of stiffened joints and muscles. In addition, Buxton has many climatic advantages. Situated in a hollow 1,000 feet above sea-level it is very bracing and tonic. Many sufferers from rheumatoid arthritis are under-oxygenated and often show a diminished chest expansion. For cases such as these, Buxton is specially indicated.

The removal of the focus of infection in *infective arthritis* usually initiates the relief or cure of the

condition. In long-standing cases, a certain amount of stiffness and limitation of movement of the joints is bound to be experienced. For these cases, stimulating treatment is indicated. Hot reclining baths and immersion in swimming baths are of great value in relieving pain and permitting a freer range of movement. Massage douches are also extensively used to disperse the inflammatory nodules and patches of indurated tissue which may interfere with the proper use of the limbs. The Droitwich brine is used solely for external application in the form of baths and douches. It is the strongest brine known. A gallon of Droitwich brine evaporated gives 21,368 grains of solid matter. Its effects in bathing are brought about by the natural buoyancy of the water, its surface action or stimulation of the skin, and the raising of the internal temperature by the prevention of heat loss.

As *osteo-arthritic changes* are mainly degenerative and occur in elderly people, a sedative spa is indicated for the treatment of the condition. Its treatment, so far as a spa is concerned, consists mainly of applications to the joints to improve the circulation and relieve pain. Movement, preferably under water, helps to maintain the usefulness of the limbs. The natural buoyancy of the water permits a range of movement that would be otherwise impossible. The key note of this part of the treatment is to get as much movement as possible without the weight bearing which is usually extremely painful.

So-called *climacteric arthritis* if untreated usually develops into osteo-arthritis. Mostly affecting the knees in women, and being associated with endocrine changes and consequent increase in weight, the treatment is mainly dietetic and medicinal, with attention to any static deformities of the feet that may be present. These may, with advantage, be supplemented by hydrotherapy at Bath in the form of general immersion baths and massage douches along the back

and local douches to the knees

*Skin diseases.*—It was suggested that gouty affections of the skin be sent to Strathpeffer for treatment. The water at Bridge of Allan has a higher calcium content than any other spa in this country. It is practically isotonic and so is more diuretic than laxative. Care should be taken in ordering the water, that the renal functions are unimpaired, as next to the bowel the chief channel of calcium excretion is the kidney. Many forms of itching skin diseases are regarded as having some association with calcium deficiency. As calcium salts increase blood coagulability, the internal use of this water is to be recommended in cases of pruritus, prurigo and urticaria where there is evidence of a lack of lime salts.

*Children's ailments* —For adenitis and debilitated states in children the iodine waters of Woodhall Spa have been given with well-marked success

#### CLIMATOLOGICAL FACTORS

In the selection of a spa, the question of situation and altitude is often of equal importance to that of the actual composition of the waters. The physiological effects of an immersion or massage douche bath are vastly different when taken at, say, an altitude of 50 feet above sea-level as compared with 1,000 feet. Temporarily the effect of a climate can be reproduced by a bath and in the same manner, its stimulating and sedative action can be increased or diminished by the atmospheric conditions under which it is given.

The following alphabetical list of the Federated Spas of Great Britain gives particulars of their altitude and situation, which it is hoped will prove of assistance in making a selection. Some facts as to the character of their waters and therapeutic indications have also been added to serve as a general summary of what was dealt with in the main part of this article.—

SPA	Character of Waters	Altitude, Situation and Surroundings	Therapeutic indications
BATH	Temp 120° F Low mineralization Relative excess of calcium ions	50-400 ft A broad valley protected from N and F winds	Diuretic and used for bathing Gout, stiff joints, fibrositis
BRIDGE OF ALLAN	Calcium with ions of Br and I muriated	50-100 ft SW aspect Wooded spur of Ochil Gently rising ground Protected from N and NE winds	Internally for itching skin diseases Debility and glandular diseases in children
BUXTON	Temp 82° F Low mineralization	1,000 ft up A broad valley Hills rising to 1,800 ft Protected from N and E winds	Goutiness arthritis and fibrositis
CHELTENHAM	Cold Muriated sulphated, with magnesium Pittville has in addition carbonate ions	200 ft Gentle slope of Cotswolds Protected from F and NE winds	Mildly purgative and diuretic Used in metabolic diseases
DROITWICH	Muriated	150 ft Gently undulating country well protected from N and NE winds	Only used for bathing purposes Arthritis and fibrositis
HARROGATE	Saline sulphur, alkaline sulphur, saline iron, chalybeate	350-600 ft Very bracing Sheltered to some extent by Pennine Range 40 miles away	Purgative waters Chologogues Treatment of metabolic errors
LEAMINGTON SPA	Muriated sulphated with magnesium	170-235 ft Built on adjacent slopes of two hills with valley between	Mildly purgative and diuretic Hyperpiesis
LLANDRINDOD WELLS	Muriated salines, simple salines, sulphurated salines	700 ft Among hills of moderate height rising to 2,000 ft to NE Bracing	Diuretic Goutiness Gouty skin diseases
STRATHFERRER SPA	High content of H <sub>2</sub> S, little Cl, almost no salt	150-200 ft Protected to N and E Mild on the whole	Purgative, diuretic and chologogic Gouty skin diseases
TREFRUW SPA	Highly concentrated iron	100 ft On western bank of River Conway Level country	Anæmia and debility
WOODHALL SPA	Muriated iodobromated	Sea level. A well-wooded "oasis" in the Fen country	Glandular conditions in children Pelvic congestion, laryngeal affections



# East Coast Health Resorts

By F W BURTON-FANNING, M D , F R C P

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UNTIL comparatively recent times it was considered that warmth was the one essential for a health resort. Experience has now shown that there are other climatic factors of equal or of greater importance. Warmth may be valuable for comfort, but for invigoration the air must have good cooling and evaporative powers. The air of the East Coast coming direct from the North Pole has an unrivalled reputation for its bracing qualities. Broadly speaking, the air of the East Coast is exceptionally bracing and pure, it is cooler and drier and more sunny than in other parts of England. According to accepted opinion summer, autumn and early winter are the best seasons on the East Coast, while January, February and March are thought to be the least favourable. As a matter of fact, it is by no means uncommon to get delightfully warm, still weather, when life in the open air is thoroughly enjoyable, after the middle of January. East winds then become more frequent, but they will be referred to later and the point as to their healthfulness or their harmfulness will be raised.

An attempt will now be made to summarize under certain headings the records obtained from different meteorological stations of the East Coast and afterwards to refer more particularly to some of the best known seaside resorts of Norfolk, Suffolk and Essex. I am quoting chiefly from the Meteorological Office's "Book of Normals," which gives the monthly normals over a period of twenty-five years, and must thank individual practitioners for information about many of their resorts, but too much importance obviously cannot be attached to the records of a single year or two, and

some do not keep any records at all.

*The mean temperature* of the East Coast for the whole twelve months is identical with that of all England, namely,  $48.1^{\circ}$  F. At Felixstowe it is between  $49.1^{\circ}$  and  $49.3^{\circ}$  F., at Clacton  $48.9^{\circ}$  F., and at Cromer  $48.5^{\circ}$  F. Taking the month of July, the mean temperature of the East Coast is  $60.5^{\circ}$  F. At Cromer, Lowestoft and other places it is  $60^{\circ}$  F., and at Felixstowe it is  $61.5^{\circ}$  F. These figures are one or two degrees lower than those of the South Coast. During the winter months the East Coast, being less affected by the Gulf Stream than other coasts, is colder. In January its mean temperature varies from  $37.8^{\circ}$  F. in several resorts to  $38.4^{\circ}$  at Felixstowe. That of Falmouth is  $43.4^{\circ}$  F. The East Coast thus contrasts with the South Coast in being colder in the winter and cooler in the summer.

*Variations of temperature* are greater on the East Coast than elsewhere. This is a distinct advantage, as in Gauvain's opinion sun-treatment is more effective where conditions are constantly changing. It is interesting to note that physical efficiency of the healthy and their output of work are best promoted by mixtures of weather.

*Sunshine* is the East Coast's strong point and its number of hours exceeds that of most other parts. At Lowestoft the average of many years' observations was 1,727 hours and in the year of 1929 there were 1,808 hours. Cromer's average is 1,620 hours in a year, or a daily average of 4.36 hours, and Clacton's is 4.7 hours. These amounts of sunshine are more than at Leysin and nearly equal to Davos. During the six winter months Felixstowe has a daily average of 2.74 hours, and from May to August there were nearly 8 hours a day.

*Ultra-violet rays* are being measured at several stations on the East Coast and the figures show that as Sir Leonard Hill says, "Places like Lowestoft and Great Yarmouth are every bit as good as Biarritz from

the ultra-violet point of view." Lowestoft's total for the year was 2,358 hours in 1929, or, for the five winter months, a daily average of 6.02. For the summer months Lowestoft leads with a daily average of 7.3 hours, while Clacton and other places on the East Coast give nearly similar records.

*Rainfall* is lower on the East than any other part of the English coast. Most of the East Coast resorts have an annual fall of less than 22 inches, while Frinton has had a record of 18 inches and Clacton of 19 inches. The average for England being 30 inches, it will be seen how favourably placed the East Coast is in this respect. But of greater importance is the infrequency of definitely rainy days. A whole day of rain is very exceptional.

*Humidity* is only recorded at a few resorts. Clacton and Cromer give 83 and 82 per cent., respectively, comparing with the mean annual percentage for all England of 83. Fogs occurred at Cromer during the six winter months on an average of seven days each year. At Yarmouth, during twelve months, there were 40 fogs, which were confined to the sea or its immediate vicinity. Good diathermancy also characterizes East Coast air.

*Winds*, which used to be considered very detrimental to the invalid, especially to the consumptive, are now known to have definite value, and excess of wind is now well provided against in most resorts. Gales make walking uncomfortable, but the East Coast is less troubled than other parts of our sea-board with strong winds. Of the 48 gales which visit England in an average year, 22 per cent. are general, 13 per cent. affect the Channel, while only 7.8 per cent. affect the East Coast.

As regards direction of winds, they blow from the east with equal frequency on the East Coast as over the whole of England and Wales.

The East Coast gets no more than its share of

east winds. At Cromer for the whole year, on 104 days the wind came from the cold quarter—namely, between N.N.W. and E.S.E., and this wind was especially common from February to May. As in the whole of England the S.W. wind is the most prevalent. Of East Coast resorts Hunstanton is so situated that its aspect is more west and its protection from the east greater. Felixstowe faces south and, therefore, also gets less east wind than other places.

*Purity of air* is assured by the unbroken expanse of sea on one side and of open country, sparsely populated and without mines or factories, on the other side. Sir Leonard Hill kindly sends me the following observation on the cleanness of the air at Corton, near Lowestoft. "A sunbeam coming through a hole in my garage is invisible till I bang my coat and make some dust come out. I have noted this several times."

*Soil and subsoil* are very dry. The coast of Norfolk and Suffolk is mostly sand and gravel on crag or chalk. Essex has gravel over London clay.

From the foregoing details it will be seen that the East Coast is colder in the winter and cooler in the summer than other parts. It is pre-eminent in enjoying more sunshine and less rain than elsewhere and in its purity. As regards winds, fog and humidity the East Coast is about equal to other districts chosen as health resorts. Sir Leonard Hill<sup>1</sup> has rationalized treatment by climate and open air. His investigations have been chiefly carried out at Corton, so his teaching bears particularly on the therapeutic use of the East Coast climate. He lays down that healthfulness depends on there being radiant heat from the sun, making also for comfort, while the air has high cooling and evaporative powers. It is important that the cooling powers should be variable and also that there should be a wide range of temperatures. Basal metabolism is maintained at a higher level, metabolism being increased during exposure to a cool wind. The secret of bracing air is

that it "keeps the lamp of life burning brightly."

It is said that five-sixths of the activity of our organs are concerned with heat production, and vigorous health depends on their being kept at full work. Confinement in an air which is too warm and too motionless overtaxes our heat-loss mechanism, and heat production must be slowed down, with consequent lessened functioning of the whole system. These statements have only to be qualified by saying that discrimination must be used and the patient's power of response to exposure and cold must be gauged. For the feeble patient with weak circulation and susceptibility to cold, exposure must be graduated and for many classes of disease a warm climate may be advisable. But for the invalid who is capable of reaction, and for many patients with fever, sensibly graduated exposure to cooling, dry air and wind, with comfortable warmth supplied by sun or by other means, constitute the conditions to be aimed at.

The consideration of the therapeutic uses of climate must be always particularly associated with the treatment of tuberculosis. Though G. Bodington initiated the treatment of consumption by open air, at Sutton Coldfield in 1840, he failed to win acceptance for his views. The general adoption of open-air treatment in this country only dates from the 'nineties, and the East Coast has played a prominent part in its introduction into England. Norfolk was chosen for the beginnings of sanatorium treatment in this country—at Downham Market in 1892, and at Cromer in 1895. From these two tentative establishments there sprang the Mundesley Sanatorium in 1899 and the East Anglian Sanatorium at Nayland in 1901. These were among the first sanatoriums to be opened in England and have remained in the first rank for efficiency ever since. Both have started offshoots for the treatment of pulmonary tuberculosis in poorer patients—Kelling Sanatorium, near Cromer, and Mundesley in 1902, and

Malting's Farm, Nayland, in 1901.

The East Coast is equally good for surgical tuberculosis. St. Luke's Hospital is maintained by the London County Council and was opened in 1922, at Lowestoft, for the treatment of tuberculosis affecting the bones, joints, glands and abdomen. The Medical Superintendent has kindly provided the following information. The results have been very satisfactory—60 per cent. of the patients discharged after treatment five years ago are now back at work. He is of opinion that the bracing air has more effect than sun, but as noted by other observers, the patients do better in the summer than in the winter. From one fourth to one-third of the inmates spend day and night on verandahs and they do better than those kept inside the very airy wards. At no time of year does the east wind present any objection. The patients exhibit not only a wonderfully healthy colour in their faces, but some have their hair bleached by the amount of exposure to sun. About ten per cent. have associated pulmonary tuberculosis, and the only conditions which are considered unsuitable for treatment at Lowestoft are the catarrhal type of chest disease and renal tuberculosis.

St Michael's Orthopædic Hospital, with 93 beds, was opened at Clacton-on-Sea in 1927. Excellent results have been obtained in its open-air wards and verandahs in cases of surgical tuberculosis, arthritis, bronchitis and other conditions. It is stated that the patients' progress is equally good in winter and in summer and that much reliance is placed on the large amount of sunshine enjoyed during the winter months.

That cold may be beneficial in pulmonary tuberculosis is proved by the established reputation of the Swiss Alps in the treatment of this disease. In 1865, two patients spent the winter in Davos and did so well that at the date of publication of W. R. Huggard's book on "Climatic Treatment," in 1906, they were

both still alive. In 1873, E. L. Trudeau spent the winter in the Adirondacks, not for any expected benefit of climate, but because he thought his tuberculosis would only allow of a few more months of life and that these might be spent in the surroundings he loved. Contrary to expectations, he actually thrived during the cold weather and he seriously considered the possible advantage in pulmonary tuberculosis of exposure to pure cold air.

It appears, therefore, that the coldness of East Coast air is not altogether prejudicial in the treatment of tuberculosis, nor is the sea-level situation. Secure in by holds that on the whole the results of treatment at sea-level are better than those obtained at high altitudes. A summer third-hand scandal is very

The obviously beneficial action of cold dry air is illustrated by the use of the cold bath. Cooling air or winds not only abstract heat from the body, but by increasing tissue change stimulate all activities, which include the elaboration of anti-toxins. Huggard made the interesting observation that patients with pyrexia "usually show in their temperature charts the influence of a spell of warm weather occurring during the cold season." He also drew attention to the loss of weight which frequently occurs on first coming to a cold climate, as a consequence of increased metabolism.

Next to the part played in the treatment of disease by cooling, the effect of sunshine has to be considered. According to many authorities this is the most powerful agent in the cure of surgical tuberculosis. An important study was made by J. Henderson Smith<sup>3</sup> of the relation of variations in weight of sanatorium patients to season. After an exhaustive inquiry he ascertained that increases in weight are greatest in the six months of May to October, with the maximum in September. Though no single climatic factor could be proved to be the cause, these six months are the season of most sunshine, highest temperature, largest rainfall and

water content of the atmosphere. Henderson Smith's conclusions were based on a study of the charts of patients at Mundesley Sanatorium and are in close agreement with those of Strandgaard, who a material was taken from eight Danish sanatoriums. He thinks that the weights of patients correspond with their general well-being and that the summer and especially the autumn are most favourable for open air treatment.

The East Coast is particularly suitable also for those who have been debilitated by illness, operation or overwork. The pure, bracing air and abundant sunshine

is very useful in fighting infectious diseases. An experienced physician makes the important observation that he has been struck with the mildness of the course run by the common infective illnesses at his East Coast resort. For instance, he seldom sees any grave complication with influenza, measles or whooping cough.

Hay-fever is much benefited by a change to the East Coast, especially as in other places while the wind is off the sea. Bronchial and nasal catarrh do well at most times of the year and exceptionally asthma is favourably influenced. Some forms of rheumatism, goitre, anaemia, neurasthenia and insomnia do well on the East Coast.

Finally, the important requirement for a health resort—occupation—is well provided on the East Coast. At the more frequented places—Hunstanton, Sheringham, Cromer, Yarmouth, Lowestoft, Felixstowe and Clacton—the usual facilities for exercise and entertainment exist. There are also many less well-known places which have their special attractions—such as the old-world town of Wells, Blakeney, with its estuary for excellent sailing, Cley, with its sea marshes and ancient quay, Runton, Mundesley, Southwold, Aldeburgh, Dovercourt, Frinton and Clacton. These and many other places have good accommodation and possess means for recreation, such as golf and other sports. The Norfolk Broads with their miles of inland



sailing provide an ideal resort for a certain class of invalids, as well as for holiday-makers.

I am indebted to Dr Sydney Long for the following notes on the attractions offered by Norfolk to the naturalist. This must be the best occupation for a large number of invalids spending their days out of doors. In the first place, from its proximity to the Continent, Norfolk affords one of the best posts in the British Isles for migration observations, especially during the autumn, when visible migration is always most marked. At Blakeney Point and Scolt Head Island—both now held for ever as Nature Reserves by the National Trust—are two of the most characteristic shingle spits we have in England. The public have access to both of these areas, though with restrictions during the nesting season, and they can watch the wonderful sight afforded by the large terneries and by many other nesting sea-birds. Alderfen Broad was recently purchased by the Norfolk Naturalists' Trust, by which it is held for ever as absolute sanctuary. Here such rare birds as the bittern, harriers and the bearded tit, which had become nearly extinct in England, can now be always seen.

Altogether, it is apparent that the East Coast provides all that is wanted for the climatic treatment of a large proportion of invalids during the greater part of the year.

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# The Climate and Health Resorts of the South-West of England

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THE south-western peninsula of England, comprising the counties of Cornwall, Devon, West Somerset, and South Dorset, extends from Weymouth on its south coast and from Clevedon on its north coast, to the Land's End. It has a remarkably long coast line, bathed by waters warmed by the Gulf Stream, which impinges upon the coasts of the more westerly portions, whilst inland the heights of the Cornish moors, of Exmoor, Dartmoor, and the Dorset Downs, afford protection to the districts lying under their shelter, and offer ready opportunities for a bracing and invigorating holiday within an easy motor run of the coastal areas.

Along these coasts and inland areas certain climatic characteristics prevail which have long been recognized to exert a beneficial influence upon persons in failing health, convalescent from acute sickness, or affected by chronic disease; characteristics of which those resident in the area owe it to others as well as to themselves to make known the more outstanding advantages and limitations. Of climatic advantages perhaps the tendency is to think first of sunshine as being the characteristic of prime medical or therapeutic importance; yet it is seldom, indeed, that places which secure the greatest amount of sunshine are chosen for invalids, irrespective of other factors—one does not send sickly persons to the Sahara or to the tropics, and all authorities on climatology, both ancient and modern, are

agreed in placing first equability or small daily range of temperature as the most important item.

Now the climate of the British Isles as a whole is noted for its equability of temperature (not of weather), the daily range being frequently less than that at Swiss or Riviera resorts. Sea air, again, is noted for its equability, and the further towards the Atlantic we go the more pronounced does this characteristic become. Hence the south-west should theoretically be possessed of a climate of exceptional equability, and this is borne out by meteorological figures extending over more than fifty years, a degree of equability, moreover, which can hardly be surpassed throughout the length and breadth of Europe. There is no abrupt variation of temperature at sunset, and whilst the days are neither so warm nor so sunny as at many foreign resorts there is an absence of the rapid variations of temperature which are experienced in so many places abroad, a feature which becomes increasingly manifest in the more westerly stations where the mean daily range seldom exceeds eight or nine degrees or in some years may be little more than seven, approximately half the mean daily range experienced on the Riviera.

Though each year yields its individual features, in an average year the coasts are exceptionally mild and sunny compared with other parts of the country, the annual hours of sunshine varying in different years from 1,500 to over 2,000; and the average hours of winter sunshine vary from 2 3 to 2 86 daily. It has been stated by independent authority that in these parts there is in the aggregate more sunshine than in any other part of England and Wales. In this respect, however, no part of England can compete with the large annual amount of sunshine and winter daytime warmth characteristic of Mediterranean stations. There are, indeed, winter days with clear blue skies and warm sun, which permit the enjoyment of basking in the open air, but it leads only to disappointment if

the visitor is lured by the expectation that warm, sunny days are constantly in evidence during the winter months, that grey skies and cold days are not to be encountered, or that warm wraps are altogether unnecessary owing to absence of biting winds.

Owing to the configuration and geological formation of the land, steep slopes and pervious soils secure a good drainage whereby surface water is rapidly carried away. Hence humidity is not excessive; and although rainfall is very heavy on the high inland areas and on the south Cornish coast, in the more eastern districts and the north Cornish and Devon coasts it is little, if any, more than over the country generally. The rainfall is frequently sub-tropical, a large amount falling in a few hours, thus keeping dust in abeyance and being conducive to a great purity of atmosphere. There are few factories to cause pollution of the air, and land fogs are rare, whilst sea mists are not frequent, seldom persisting after the early morning hours. Snow is rarely seen and thunderstorms are of very uncommon occurrence in the coastal districts.

Such are the general characteristics of climate common to the whole peninsula, but in the different quarters of the area considerable variation in detail is found. Along the southerly coasts of Devon and Cornwall at the sea-level, the climate is relaxing and is more suitable for those who need to live slowly and restfully, to make good the ravages of fatigue or disease, whether of mind or of body, and especially for those suffering from catarrh of the respiratory system. Those suffering from bronchitis and other respiratory affections do extremely well, and asthmatics in some districts, whilst in cases of chronic nephritis the disease seems to make but slow progress, cases of heart disease also do well. Lying back from the sea-level the rising country provides a more bracing and invigorating atmosphere, and being further from the sea and nearer to the highlands, is more suitable for

those who wish to spend their days in the open country air. At still higher levels there are a few small towns, such as Chagford, the Moretonhampstead district, Yelverton on Dartmoor, Dulverton and Exford on Exmoor, and Launceston over the border between Dartmoor and the Cornish moors. Such places are a great asset in summer for those who have spent long periods on the coast and need a bracing change.

Along the South Dorset coast the climate is highly bracing; the resorts mainly have an eastern aspect. Delicate children, and adults convalescing from acute disease, benefit greatly, as do some cases of asthma and other respiratory affections. Along the northerly coasts the air is bracing at sea-level, whilst the wind-swept heights provide a rich tonic for those strong enough to benefit by it, and in many parts shelter may be found in wooded hollows and narrow valleys. The north-west Cornish coast is the most bracing part of the more western counties, and here anæmic patients, those suffering from debility not associated with organic disease, and asthmatics usually do well. The north coast of Devon and Somerset is noteworthy for the frequency of longevity. In these parts phthisis is a comparative rarity, and the available shelter from wind with abundant sunshine combine to constitute conditions favourable at least to incipient cases; and slightly inland more sheltered spots are to be found which afford good opportunities for excursions and other outdoor amusements. It should be noted that for the most part these northerly coasts are not suitable for cases of acute rheumatic disease, valvular disease of the heart, and neuralgia.

In setting out to decide which locality is likely to suit any given individual it is not the nature of the disease which has exclusively to be considered, but the individual peculiarities of the patient, to take into consideration the temperament or psychological constitution of the individual as well as the balance of

bodily function which, taken as a whole, goes to make up his physical constitution. It is these factors known only to those who have the opportunity of observing him closely that comprise the individuality of the patient which should be considered in its entirety, before selection of locality is finally made.

Whereas the different health resorts situated in the south-west have each their individual medical value, there are certain characteristics in this respect also which are common to the whole district: (1) The remarkable frequency of old age. Whether in town or country this is a noteworthy feature among the residents, whether they be natives or imports who have come to spend their declining years in a climate most suitable to their requirements; (2) the comparative rarity of bronchitis and nephritis among the natives, and the beneficial effect upon cases which have immigrated on account of these disabilities; (3) the comparative rarity of zymotics, (4) the comparative rarity of insomnia and the beneficial effect upon cases from other parts of the country, (5) the absolute rarity of renal calculus.

Of individual towns, though the following are the most noted, there are others, smaller and less well known, that may prove attractive, more especially to those who wish to avoid the clash of social life for a while, and rusticate in seclusion.

#### HEALTH RESORTS ALONG THE SOUTHERN COASTS OF THE SOUTH-WESTERN AREA

*Penzance* (12,087 population), South Cornwall, is the most westerly and the warmest winter health resort in England. Faces south-east, sheltered on north and west, being situated in the north-west corner of Mount's Bay, in an attractive neighbourhood between the Land's End and Lizard Head. The town is well drained and the water supply good. Mean daily range of temperature is given in different series of years as 9 9° and 7 8° F. Annual sunshine, 1,742 hours, winter sunshine, 408 hours. Mean average temperature 52 6° F. Mean winter temperature 46 6° F. Annual rainfall 40 9 to 43. Mean humidity, about 79.

Cases of phthisis, bronchitis and irritable conditions of the

respiratory system do well, including some cases of asthma, also persons suffering from chronic nephritis and heart disease. Some cases of neurasthenia and other nervous ailments also derive benefit. Season—winter and spring. Penzance is also suitable for aged persons and those home from the tropics. It is not suitable for rheumatic diseases, including chorea, or for the anæmic patient.

*Falmouth* (13,492), South Cornwall, is situated on the north-west corner of Falmouth Bay at the mouth of the River Fal, which is here widening into a magnificent natural harbour suitable alike for large ocean-going steamers and small sailing boats. The town is well laid out, well drained, and has an excellent supply of very soft, pure water. It has a southerly aspect and there is abundant sub-tropical vegetation, the climate being very mild, moist, and remarkably equable—the most equable in England. The daily range of temperature over extended periods is 8° 6', but during the winter months it averages only 6° 8'. Annual sunshine, 1,750 hours. Winter sunshine, average 2 72 hours daily. Mean average temperature 50° 8' F. Highest recorded summer temperature 80° F. Mean winter temperature, 45° 8' F. Annual rainfall, 43 to 45 inches. Mean humidity, 81 to 83.

Persons suffering from affections of the chest, especially those of a catarrhal or irritable nature, are admirably suited. Those suffering from nephritis and affections of the heart and most cases of insomnia derive great benefit. Some cases of anæmia and of debility also benefit, but others require a more bracing climate, such as is found on the north Cornish coast. Falmouth is excellent for children and old people, but too relaxing for healthy adults. Season for invalids—winter and spring. Persons suffering from the rheumatic diseases or from neuralgia would be better suited elsewhere.

*Fowey* (2,170), South Cornwall, is a restful, quiet little town lying in a sheltered position on the estuary of the Fowey river, facing south. The climate is very equable but humid. The supposed Troy Town of fiction. Sunshine, 1,644 hours. Mean annual temperature, 50° 2' F. Mean winter temperature, 45° 1' F. Rainfall, 36 5 inches. Fowey is suitable for those who need to live a quiet life away from noise and excitement. Season—winter and spring.

*Salcombe* (2,199), South Devon, is a quiet, peaceful spot on the estuary of Salcombe river, in a very sheltered position between Bolt Head and Prawle Point. The river is not easy of access from the sea at certain tides, by reason of the Bar, which is said to have inspired Tennyson's poem. The climate being very mild, sub-tropical vegetation flourishes. Annual sunshine, 1,724 hours.

Salcombe is suitable for those needing the peace of quiet surroundings. Season—winter and spring.

*Torquay* (46,165), South Devon, is the principal health resort in the West, a reputation which was first acquired about the middle of last century. Clustering round the north-east corner of Torbay, the original town occupied a remarkably beautiful and sheltered position situated on the southerly and westerly slopes of hills which gradually rise from the sea level to a height of about 450 feet,

and later the town has extended to the hill tops and flowed over into the surrounding country, thus it affords a variety of climates at the different elevations, sedative and relaxing near the sea, more bracing on the hills. In the middle of the town, which faces south, is the quaint old harbour from which the town derives its name. There is luxuriant sub-tropical vegetation, a perfect drainage system, and a magnificent supply of soft moorland water which ranks with the best upland surface supplies in the kingdom. The climate is equable without excessive rainfall. Mean annual daily range of temperature,  $11\ 1^{\circ}$ . Mean daily range for the winter months,  $8^{\circ}$  to  $9^{\circ}$ . Annual sunshine, 1,791 hours. Winter sunshine average, 286 hours per day. Mean average temperature,  $51\ 4^{\circ}$  F. Mean winter temperature,  $41\ 5^{\circ}$  F. Annual rainfall, 31 to 34 inches. Mean humidity, 78.

The Torbay Medical Baths are controlled by the corporation, are thoroughly up to date, and offer most of the recognized treatments by hydrotherapy as well as electrotherapy, there is an open Vita glass lounge. Within the last few years Torquay has developed its own natural mineral water of great purity, belonging to the same class as Epsom and Vittel.

The climate of Torquay is particularly suitable for those in whom it is desirable that life shall be rendered as easy as possible, expenditure of energy reduced to a minimum, and opportunity afforded for the accumulation of reserves upon which to draw in time of stress or effort. Persons inherently delicate, elderly persons, young children, convalescents, persons who have returned from the tropics, and those who, on account of the strain engendered by residence in more northerly climates or from the overstrain of modern business life, require relaxation and rest. It is also beneficial in most cases of diseases of the respiratory tract. Especially the bronchitis of elderly subjects, phthisis, catarrh, bronchitis, asthma. Cases of chronic nephritis, arteriosclerosis, and some cases of conditions of the myocardium, do well, provided care is taken to secure accommodation in the more level parts of the town. Reason for invalids—winter and spring. Anæmic persons and persons in full vigour would be better suited on the north coast than in the western extremity. Torquay merges into Paignton.

Paignton (18,405), South Devon, is a town growing rapidly in favour as a place of residence and as a health and holiday resort. Situated on the shores of Torbay, facing east, it is built on a round with low hills on the west. There are fine sands and facilities for games and sports. It is more bracing than Torquay. There is a supply of good, pure moorland water which is augmented as rapidly as possible to meet the rapidly increasing needs of the town. Mean daily range,  $12\ 2^{\circ}$ . Annual sunshine, 1,709 hours. Mean temperature  $51^{\circ}$  F. Mean winter temperature  $44^{\circ}$  F. Annual rainfall, 37 inches. Mean humidity, 76.

Indications are much the same as Torquay, but Paignton, being more bracing and more level, is, perhaps, better suited to older persons and adults to whom the keener air is not detrimental. In summer, at Paignton, the colder months also.

Exeter (10,019), South Devon, is situated on the estuary of



holiday resort throughout the year. Excellent accommodation is obtainable. There is an admirable supply of pure, moderately hard water. The sanitation is excellent and the magnificent sands and the surrounding country provide ample facilities for healthy outdoor enjoyment. Warm sheltered promenades are also available. The climate is mild, but bracing and very equable. Mean winter daily range, 8°, about half the range on the Riviera. Annual sunshine, 1,669 hours. Average daily winter sunshine, 2.61 hours. Mean average temperature, 51° F. Mean winter temperature, 45° F. Rainfall, 34 inches. Mean humidity (to 1912), 84.

Newquay is suitable in winter for most persons suffering from any of the chronic tuberculous affections. Cases of asthma, debility, and neurasthenia frequently derive great benefit. It is especially indicated for anæmic persons and delicate children. It is not indicated for those suffering from rheumatic affections and cardiac disease. It is seasonable all the year round.

The climate of the district around *Tintagel* and *Boscastle* is worthy of more than passing notice, being very equable but stormy, moderately bracing and rainfall heavy. It is said that persons suffering from asthma are greatly benefited, and cases of nephritis very rarely occur in the district. It is not suitable for those suffering from rheumatic affections, neuralgia, insomnia.

*Bude*, with *Stratton* (3,958), North Cornwall, is a summer resort fully open on the west to the Atlantic, sheltered from the east and north. It is moderately bracing in summer and autumn and mild in winter, but exposed as it is to the uninterrupted expanse of the Atlantic, strong winds are to be expected. There is a good supply of pure water. Mean temperature, 50.9° F. Rainfall, 30.9. Sunshine, 1,637 hours.

Bude may be recommended to those suffering from anæmia and debility and some cases of bronchial catarrh. It is not suitable in cases of phthisis, rheumatic affections or neuralgia.

*Barnstaple* (14,409), North Devon, is mainly a residential town, and stands on the north bank of the estuary of the Taw some seven miles from the sea. There is an abundant supply of pure water, the sanitation is excellent and the climate equable, with a heavy rainfall. It is the centre of a fascinating district, lying between the sheltering heights of Exmoor on the north and east, and the level land extending on either side of the Rivers Taw and Torridge, which here discharge their waters into Barnstaple or Bideford Bay.

*Bideford* (9,125), North Devon, on the banks of the Torridge, enjoys an equable climate, though there is excessive humidity in the winter months. The neighbouring town of *Westward Ho!* on the coast some three miles to the north, with a north-westerly aspect, is said to be peculiarly free from tuberculosis. Old people, persons home from the tropics, and children are well suited by the climate, which is more bracing than South Devon, and milder than other parts of North Devon. Diseases of the chest and nephritis are uncommon, and persons suffering from these complaints should do well. This district is not indicated in cases of heart disease, the rheumatic affections, anæmia and neuralgia.

*Ilfracombe* (11,772), North Devon, is the principal health resort in North Devon. Situated in the midst of some of the most gorgeous scenery in the county, it is thoroughly sheltered from westerly and south-westerly gales, and in part from the north-west, it is protected also from east and south-east, but open to north and north-east. Yet, notwithstanding the northerly exposure, Ilfracombe is by no means cold even in winter. It has excellent sanitation and a pure, moorland water supply. The climate is remarkably equable (second in England only to Falmouth in that respect). Mean daily range,  $8\cdot4^{\circ}\text{F}$ . Sunshine, about 1,500 hours. Average winter sunshine,  $2\cdot3$ . Mean summer temperature,  $58\cdot4^{\circ}\text{F}$ . Mean winter temperature,  $46\cdot5^{\circ}\text{F}$ , other observations make it  $49\cdot9^{\circ}\text{F}$ . Rain-fall, 37 inches.

**Medical indications.** There seems to be some conflict of opinion regarding the suitability of Ilfracombe for persons suffering from phthisis and from asthma, which is probably due to the fact that more than usual care has been taken to ascertain the exact truth in this respect, and that, as is to be expected, some cases of both these affections derive benefit when accommodated in a part of the town suitable to them, whilst others do better elsewhere. Persons subject to other respiratory complaints are undoubtedly well suited by the climate, and old people, convalescents and neurasthenics all derive benefit. Unsuitable for anæmia, rheumatic affections, and advanced heart disease. Seasonable all the year.

*Lynton* (2,587) and *Lynmouth*, North Devon. The former is 450 feet above the sea, the latter at sea level. Abutting on Exmoor, this is a district of the loveliest scenery, very healthy, sheltered except from the north and north-east. The rainfall is heavy, being over forty inches, and the climate equable, Lynton being somewhat bracing, Lynmouth warm. The climate at the higher elevations is said to benefit cases of early phthisis, anæmia, debility and insomnia, and that at the lower elevations to be suitable for old people, Anglo-Indians, and some cases of phthisis. This district does not suit cases of rheumatism, heart disease, bronchitis, and eczema. Season—summer.

*Minehead* (6,315), Somerset, lies mostly on level ground, rising to 300 feet, from which Exmoor is readily reached. It is protected from south-west, west, and north-west, but open to north-east, though some shelter from that quarter is given by the North Hill. The climate is mild but invigorating, cool in summer, warm in winter notwithstanding the north-easterly aspect, the town has a soft, palatable moorland water supply. Mean winter temperature,  $44\cdot8^{\circ}\text{F}$ . Winter sunshine, average 2,293 hours. Annual rainfall, about 36 inches.

Suitable for cases of heart disease, nephritis, rheumatism, arterial hypertension, insomnia, and nervous overstrain. A resort with a climate that is particularly suitable for young children, for persons past middle age, and for convalescents, all the year round. It is not suitable for cases of phthisis or other forms of tuberculosis, or of diseases of the liver and biliary tract.

*Burnham-on-Sea* (about 7,500), Somerset, is on the south bank

of the Bristol Channel, fully open to the west, between the estuary of the River Brue and Brean Down headland. Fine sands, modern sanitation, excellent water supply from Mendip Hills. Claims to have a mild, equable climate (1930 rainfall, 30.3 inches, 1931 rainfall, 30 inches), but meteorological statistics are not available. Is said to be remarkably immune from tuberculosis and pulmonary diseases, and to be suitable for those who suffer from overstrain. There are, however, insufficient data upon which to base advice regarding this resort.

*Weston-super-Mare* (31,643), Somerset, faces due west, and is sheltered from northerly winds. At low tide an immense tract of sandy mud is left exposed, which is not only without unhealthy influence but which, it is claimed, contains a large proportion of iodine. The climate is mild, temperate, very bracing, rather dry in winter, and windy in spring. Mean daily range 11-5° F. Average yearly sunshine, 1,507 hours. Mean winter sunshine, 2.2 hours. Mean winter temperature, 42.8° F. Rainfall average, 32.8 inches. Relative humidity, 78 per cent.

The climate of Weston is beneficial to persons suffering from overwork, convalescents, and children of all ages, especially those from India and the tropics. Persons suffering from anaemia, from catarrhal affections, and from chronic rheumatism also benefit, as do cases of fibroid phthisis, and of tuberculous joints and glands. It is not suitable for cases of acute and hæmorrhagic phthisis. Season—summer, autumn and winter.

*Clevedon* (6,724), Somerset, is described as a sunny little town with a mild and restful climate. Standing in a hilly district, partly sheltered from the north, it faces south-west. A feature of interest is the large number of wild flowers and birds that may be found. There is a good supply of rather hard water. The climate is equable, very mild in winter, relaxing in summer, rather humid.

Suitable for elderly people, for persons suffering from catarrhal affections, and for young children. Not suitable for cases of heart disease or phthisis. Season—winter and spring.

In the foregoing attempt to summarize briefly the characteristics of the climate of the South-western peninsula of England and the medical indications and contra-indications to be applied when the welfare of the sick is under consideration, reference has not been made to the suitability of the district for the hale and hearty—yet prevention is better than cure. It is insufficiently recognized that the varying climate of the British Isles is among the most health-giving in the world, the beneficial qualities of variability of weather being a point that most lay people altogether fail to appreciate. Yet there is good authority for

contending that this constant unsettlement, this constant range of weather, whilst admittedly detrimental to pleasure and enjoyment, is better from the point of view of health preservation—whether mental or physical—than is the more enjoyable climate characterized by constantly settled weather conditions

Hence there can be little reason on the score of health for those who seek to lay down a store of health during hard-won holidays to feel constrained to find the necessary opportunities outside the lands of their birth. Moreover, in the south-west there are ample opportunities for indulging in sports of all kinds by land and by sea, in a climate that in summer is cooler than London to the same extent that in winter it is warmer; the district is readily accessible with the least expenditure of time and money and in the greatest comfort, and the most complete organization of services is available for any who may have the misfortune to meet with accident or sickness during absence from their homes

In conclusion, I must acknowledge the great assistance I have derived from the following authorities :—

“A Book of the South-West” Issued at the 75th Annual Meeting of the British Medical Association, held at Exeter “Climatotherapy and Balneotherapy” By the late Sir Hermann Weber and Dr F Parkes Weber “Health Resorts of the British Isles.” Edited by the late Dr Neville Wood. “Health Resorts of the British Coasts” By Dr. Fortescue Fox. The municipal authorities of many of the resorts mentioned.

of the Bristol Channel, fully open to the west, between the estuary of the River Brue and Brean Down headland. Fine sands, modern sanitation, excellent water supply from Mendip Hills. Claims to have a mild, equable climate (1930 rainfall, 30.3 inches, 1931 rainfall, 30 inches), but meteorological statistics are not available. Is said to be remarkably immune from tuberculosis and pulmonary diseases, and to be suitable for those who suffer from overstrain. There are, however, insufficient data upon which to base advice regarding this resort.

*Weston-super-Mare* (31,643), Somerset, faces due west, and is sheltered from northerly winds. At low tide an immense tract of sandy mud is left exposed, which is not only without unhealthy influence but which, it is claimed, contains a large proportion of iodine. The climate is mild, temperate, very bracing, rather dry in winter, and windy in spring. Mean daily range 11–5° F. Average yearly sunshine, 1,507 hours. Mean winter sunshine, 2.2 hours. Mean winter temperature, 42.8° F. Rainfall average, 32.8 inches. Relative humidity, 78 per cent.

The climate of Weston is beneficial to persons suffering from overwork, convalescents, and children of all ages, especially those from India and the tropics. Persons suffering from anæmia, from catarrhal affections, and from chronic rheumatism also benefit, as do cases of fibroid phthisis, and of tuberculous joints and glands. It is not suitable for cases of acute and hæmorrhagic phthisis. Season—summer, autumn and winter.

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# The Health Resorts on the South and South-East Coast

By LENNOX WAINWRIGHT, M D, M R C S, L R C P

TO a practitioner in the West End of London, who for many years has been accustomed to send his patients to the Riviera or Egypt, and to the French and German spas, the present times present many difficulties. Of course, the war years had the same difficulties, but those of us at home were so busy with Red Cross and similar work and had so many other anxieties, that the spa and health resort problem did not seem such a serious one as to cause undue worry.

Today, however, it must be confessed that the problem may present considerable difficulties. It is not only that the health resorts and spas abroad have been familiar to me for some thirty years, but the physicians at the spas and their methods of treatment are familiar to me, and I have known exactly what treatment my patients would have. One is glad to know, therefore, that the British spas are making a serious effort to attract visitors who used to go abroad, and that the authorities at the spas are working in conjunction with the members of the local medical profession.

In this symposium in *THE PRACTITIONER* I shall describe the health resorts which lie closest to London. These include the health resorts in the south and south-east coast, stretching from the rather relaxing Bournemouth in the south-west to the decidedly bracing Margate at the north-east corner of Thanet. There are, however, in addition, two inland health resorts within easy reach of London at which patients may

conveniently convalesce—namely, Hindhead (Surrey) and Tunbridge Wells (Kent).

The *Hindhead* district is about forty miles from London and is notable for its heather clad hills and sandy moors, reminiscent of Scotland, the hills rise to a height of nearly 1000 ft., and the climate is bracing, but not bleak. There is suitable accommodation to be found in the little towns of Hindhead and Haslemere and in the scattered village of Churt, stretching nearly to Farnham Pond. Not only has this become a favourite residential district, but it is particularly suitable for convalescence after operations or illness and for delicate children.

*Tunbridge Wells* is just over thirty miles from London and is high and bracing, yet sheltered. It is one of the sunniest of English inland health resorts. In the seventeenth and eighteenth centuries *Tunbridge Wells* was one of the most fashionable spas, and its famous promenade, the "Pantiles," is still resplendent of the eighteenth century. The spa declined during the nineteenth century, but is on the up grade again, and I for one would be very pleased to see *Tunbridge Wells* in its old place again among the fashionable spas, for I am very fond of the old fashioned town, with its charming walks. Patients I have sent there have found it agreeable, and its chalybeate waters (which contain 60 parts per 100,000 of ferrous carbonate) beneficial, especially in dyspepsia, anæmia, and in certain cases of gout. I consider this town an excellent substitute for many of the German and Belgian spas.

*Bournemouth* has a milder climate than the coast towns farther east, not so stimulating, but more suitable for nerve cases and for convalescence after pneumonia and pleurisy. It has long had a reputation for the treatment of early tubercle, and its mild climate is certainly beneficial to suitable cases. The subsoil is composed of sand and gravel, and the beach is a sunny beach six miles in length. The climate is equable and warm in winter. There are pine-crowned cliffs and beautiful parks and grounds with abundance of evergreen foliage. A noted feature of the sea front is a magnificent stretch of sheltered undercliff drives and promenades several miles in extent. The climate is very similar to Biarritz and the Biscayan coast, and being only two hours from London it offers great advantages to those who wish to enjoy a good, mild climate nearer home.

The *Isle of Wight* has had a reputation as a health resort for hundreds of years, *Ryde* and *Cowes* face full north, and *Sandown* east, and are more bracing than *Ventnor*, which is milder and particularly good for bronchial cases. *Shanlin* has a chalybeate water, which contains 68 parts per 100,000 of ferrous carbonate, and is suitable for anæmic and debilitated patients.

*Bognor Regis* is now famous as the place the King went to convalesce after his serious illness, and is an excellent winter resort as well as a pleasant holiday place in the summer. It has a low rainfall and an exceptionally high sunshine record. It has an enterprising local authority and is making the most of the opportunity given



it by the King's uninterrupted restoration to health by providing suitable facilities and amusements for visitors. Bognor is well suited to all delicate people and to those who like a mild English climate.

*Worthing*—Sheltered by the South Downs, Worthing is renowned for its sunny climate and has no fewer than nine different convalescent homes for children. The sunshine recorded at Worthing is frequently the highest in Great Britain. Evidence of the mildness of the climate can be found in the fact that figs ripen in the open air. Semi-tropical trees flourish, market gardening is one of the town's industries, there is a very good sand and shingle beach and very charming gardens useful for invalids and for those who require exercise after illness.

*Brighton* is an ideal place for recuperation after an operation or debilitating illness. It is easily reached from London—one has hardly time to finish one's newspaper before the train has arrived in Brighton—it has any number of excellent hotels and boarding-houses of all sorts and at all prices, and it has a sufficiency of amusements to prevent boredom. It has a dry, bracing atmosphere, fogs are almost unknown, and northerly winds are kept off by the South Downs, which are a natural protection to the town, and among which are many interesting walks. Brighton is one of the best places I know to send a convalescent patient in the winter, instead of the Riviera. It has not, of course, so much winter sunshine as the Riviera, but neither has it the treacherous chill that the Riviera has at sunset, and which I have known to cause many a cold, many cases of pneumonia, and not a few deaths, among convalescents wintering there.

Beachy Head gives *Eastbourne* a distinction quite lacking in rival south coast resorts. It has a most invigorating climate and its wide, airy streets are lined with trees. The hours of bright sunshine are exceptionally long, and Eastbourne's total of sunshine in 1929 was the highest registered in Great Britain. At the eastern end of the sea front are the Redoubt Music Gardens and the Corporation are enterprising in providing concerts and other diversions at Devonshire Park. The adjoining countryside is admirable for drives and rambles. The climate is equable, but bracing, suitable to those who require healthy exercise, and is similar to the seaside resorts of the Normandy coast.

*Bexhill-on-Sea*—Its situation at the point where the Channel and North Sea tides meet gives Bexhill a mixture of the mild South Coast and bracing East Coast climates. It faces south in the beautiful Pevensey Bay between Hastings and Eastbourne and has a sea front of nearly five miles. Bexhill's chief industry is education, and it has a very large number of schools for boys and girls, being a favourite town for children from abroad and the East. The climate is especially suited for cases of bronchitis and bronchial catarrh and for anæmic patients and convalescents.

*Hastings* and *St Leonards* have a very mild climate, suitable for those with chest complaints or for people home from a hot climate, such as India. The aspect is full south and the climate

mild on the sea front. It is well sheltered by cliffs and hillsides, but the cliff tops are more bracing. The drives and walks around are a very important factor in its attractiveness. There is a good orchestra, and throughout the winter classical and popular concerts are given. This extremely sheltered winter resort is only 1½ hours from Charing Cross, and its winter climate is certainly one of the mildest and driest on the south coast.

*Rye and Romney Marsh* — This part of the world has a character of its own, unlike anything else in England. It is very suitable for nerve cases, the flat yet picturesque surroundings having a very soothing influence on patients. *Dymchurch*, in Romney Marsh, has very good sands, and the climate is mild but bracing. *Littlestone*, which is a little farther on, has excellent golf links and is a favourite resort and residence for people who desire a rural seaside place.

*Hythe* — Its position favours Hythe for a winter resort, as it is built on the side of a hill, extending down to the sea, with the Downs at the back acting as a protection from the north wind. There is a golf course, and excellent shelter on the sea front. To those who require quietude and a moderately mild winter climate Hythe is eminently suitable.

*Folkestone* has a southern aspect and the climate is dry and bracing on the cliffs. The Leas are 200 ft. above the sea level, bordered on one side by palatial hotels and residences, and have a wide view intersected with grass expanses and pretty flower-beds. Wonderful views can be enjoyed of the busiest part of the Channel, and the white cliffs of France are shown distinctly in clear weather. Beneath the Leas is the undercliff, which has sheltered paths fringed with trees and is entirely sheltered from the north. The Corporation has been fully alive to the wants of their visitors and residents and arrange orchestral concerts by the municipal orchestra. The walk along the lower road from Folkestone to Sandgate, sheltered by the Encombe cliffs, is extremely delightful, thoroughly sheltered and quite suitable for invalids who require exercise on the flat and a sheltered, sunny aspect. I look upon *Sandgate* and the ridge above as the healthiest part of Kent.

*Deal and Walmer* are really one long town stretching along the edge of the sea, opposite the Goodwin Sands, in the narrow channel between which and the coast a constant stream of shipping passes, a spectacle which never fails to interest the convalescent staying here. There are two famous championship golf courses at Deal, and the climate is distinctly stimulating.

*St. Margaret's Bay*, between Walmer and Dover, is a quiet, sheltered little spot which has long been a favourite of mine for sending patients to recuperate after serious illnesses. Although quite small, good accommodation is available, and the bathing here is excellent.

Although near Margate, *Ramsgate* is totally different in climate, as it faces almost directly south. The happy combination of a wonderful climate and a splendid situation has made Ramsgate an

admirable winter resort where all the benefits of sunshine and an invigorating atmosphere can be enjoyed. The average annual sunshine exceeds 2,000 hours, while the breezes from the North Sea infuse a tonic into the air. On the East Cliff there are charming Winterstoke Gardens commanding a view of the Downs, and the St. Lawrence Cliffs provide a new attraction to the charms of this progressive town. Its town council is enterprising and has recently spent many thousands on improving the marine parade. In winter months Ramsgate is warmer than other East Coast and South-east Coast resorts. It has always had a good reputation for early cases of tubercle.

*Broadstairs*, between Margate and Ramsgate, is well supplied with hotels and amusements and is easy of access from London. The Yarrow Home for Convalescents and fourteen other convalescent homes have put Broadstairs in the forefront of those health resorts which are particularly suited for the young. The front extends for nearly four miles along a range of undulating chalk cliffs. The sands are very well sheltered.

*Margate* is one of the most bracing places in the country, with a fine beach and good bathing, it is perhaps almost too popular in August, but much more pleasant than many people imagine in other months. Its Sea-Bathing Hospital was founded so long ago as 1796. The air from the sea and the refracted rays of the sun make this an ideal spot for the sluggish, glandular type of patient as well as an extremely attractive resort for the healthy. The sandy beach of Margate is well sheltered, although it has a northerly aspect. It is quite attractive, both in winter and summer.

*Westgate-on-Sea*, about two miles west of Margate, is a charming place to reside. It is distinctly quiet, but is well provided with winter entertainments. The air is equally good for adults and children and for those who want rest and change.

It will be observed, then, that in this comparatively short coast-line there is a wide choice of climates—some mild, some stimulating, and that the types of health resorts vary greatly—from Rye to Brighton. With the help of these short notes the practitioner who is not familiar with the south coast may be enabled to choose a suitable environment for different patients.

# Thrombophlebitis Migrans vel Recurrens

By F PARKES WEBER, M D, F.R.C.P.,

AND

E SCHWARZ, M D

*Physicians to the German Hospital, London*

IT is not necessary to discuss at length the whole subject of thrombophlebitis migrans (*vel recurrens*), with the troublesome and tedious course of which the American and English writings of W. W. Herrick<sup>1</sup> (1911), Moorhead and Abrahamson<sup>2</sup> (1928), Ryle<sup>3</sup> (1930), and others<sup>4, 5</sup>, have made physicians in England fairly familiar. It may be assumed that the disease is probably due to an infection of low virulence, though no causative microbe has yet, we believe, been cultivated from the patient's blood, a *Streptococcus viridans*, however, was grown from the sputum of one of Ryle's patients. There may be a constitutional vascular or general condition disposing to the infection.

In April, 1907, one of us (F P W) attended a well-built Englishman (C L), aged 50 years, who gave a history of having suffered in 1884 from swelling of the legs after a severe attack of typhoid fever in India. In 1893 some veins over his abdomen were apparently thrombosed. In 1898 he had another attack of thrombosis. In 1903 his left leg was affected and since then he had suffered from recurrent attacks in the lower limbs, sometimes in one, sometimes in the other, these attacks had recently become more frequent. In January, 1907, the right popliteal region became affected after an attack of "influenza." When seen in April, 1907, the right leg was decidedly bigger than the left, there were hard veins in the right foot and leg reaching up to the popliteal region, but there was no active phlebitis, unless a small tender patch on the dorsum of the right foot. Otherwise he seemed to be in good health. The original trouble in the right lower extremity had probably been thrombotic obliteration of the femoral vein, as was suggested by Mr (afterwards Sir) A Pearce Gould. Improvement (notably in regard to the swelling of the right leg) followed the use of a crape bandage and careful massage, but the patient left London and the subsequent history is not known. In that case there was a history of supposed primary syphilis at the age of eighteen years—but not of any syphilitic symptoms after that.

This case may be compared with Pearce Gould's<sup>6</sup>—  
A man who, when seen by Pearce Gould in 1901, was aged 49

years, in 1876, during convalescence from typhoid fever, suffered from thrombosis of first one femoral vein and then the other. Ever since that time he had been liable to thrombosis from slight injuries. Indeed, thrombosis had often occurred without obvious exciting cause. "Out of twenty-five years he had spent no less than six years, two months, and one week invalided by these successive clottings." Recently thrombosis of the left median basilic and the adjoining portion of the left basilic vein had been set up by his being somewhat roughly seized by the left elbow.

In regard to older foreign literature on the subject of thrombophlebitis migrans (*springende Thrombosen*), special reference should be made to Karl Forsterling's paper, in 1909<sup>7</sup>, on extraordinary and rare cases of multiple venous thromboses in many parts of the body, of uncertain causation. He had evidently thoroughly searched the literature.

An example at a relatively early stage of the disease was one in a somewhat anæmic young man (W D), aged 21, who was admitted to hospital under one of us (F P W) in November, 1928. He had thrombosis of the external saphenous vein on the right side after having been in another hospital with venous thrombosis in the left leg. He did not seem otherwise ill, excepting for moderate anæmia, the erythrocyte count was 3,850,000 (hæmoglobin, 75 per cent), but a leucocytosis of 12,900 (polymorphonuclears, 70 per cent) and very slight fever suggested mild infection of some kind. The blood-serum gave negative Wassermann and Meinicke reactions, and there were no signs of tuberculosis. Afterwards the right internal saphenous vein was also affected, and he was not able to leave the hospital till the middle of January, 1929.

J B Ellison<sup>8</sup> described mild thrombophlebitis migrans complicating scarlet fever in two boys, aged 6 years and 10½ years respectively.

Needless to say, in ordinary, apparently healthy, young adults with the history of having suffered from two or more separate attacks of non-suppurative thrombophlebitis, the possibility of further attacks must be seriously considered in regard to acceptance for life assurance (and of course in regard to insurance against illness).

That some of the supposed embolisms in thrombophlebitic patients are really concurrent foci of thrombophlebitis in lungs, brain, mesentery, kidney, and elsewhere, was suggested by A. W. Owens<sup>9</sup> in

1928. But this interpretation still requires substantiation, and it is hardly possible to explain in that way the repeated fine pulmonary embolisms in the following case —

A well-built young German (E N ), aged 27 years, was under Dr Schwarz's care in 1927 for recurrent attacks of thrombophlebitis in the right lower extremity. When about 20 years of age (seven years previously) he had lost a great deal of blood (acutely, causing faintness with loss of consciousness) from a wound received in a student's duel. This loss of blood was followed by thrombophlebitis in the right lower limb, from which he recovered. In 1926 he had extensive venous thrombosis in the left leg. The thrombophlebitic attack for which he was under Dr Schwarz's care commenced in the summer of 1927. It affected the right lower limb and was later on accompanied by repeated pulmonary embolisms with slight hæmoptysis, and at one time some fever. He was readmitted in February, 1928, for thrombophlebitis of the right internal saphenous vein. The internal saphenous vein proximal to the affected portion was ligatured by Mr H. Rast, and the thrombophlebitis did not spread beyond the ligature. Nevertheless, we are not inclined to regard operative treatment in cases of the kind as free from danger. Dr Schwarz saw the patient again in the autumn of 1931, for thrombophlebitis in the left leg, which was accompanied by two attacks of embolic hæmoptysis, one of them nearly fatal. After about ten weeks, however, he recovered.

#### CASES SYMPTOMATIC OF THROMBO-ANGITIS OBLITERANS

As an example of nodular thrombophlebitis migrans forming part of the clinical picture of thrombo-angitis obliterans ("Buerger's disease"), we instance the following case —

A Russian Jew (M.M.), now aged 66, has been seen at intervals by one of us (F.P.W.) since May, 1906. He came to England at the age of 25, and the symptoms of thrombo-angitis obliterans commenced gradually at the age of 38 (in 1902 or 1903) with pain in the left lower limb on walking, of the nature of intermittent claudication. The disease progressed by exacerbations, but there were prolonged periods of quiescence, with remission or absence of pain (apart from the intermittent claudication pain). Both lower extremities and the right upper extremity became involved. Besides the typical symptoms, including slight ischæmic ulceration, in the feet, he suffered from attacks of superficial thrombophlebitis, notably of the "cutaneous nodular" type. Since 1924 there have been no active signs of the disease, but the patient has had slight attacks of gout in the big toes and elsewhere, and has developed permanent high blood-pressure with renal involvement. The circulation of blood in the skin of both feet is good, and he can walk

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# Practical Points on Modern Infant Feeding

By BERNARD MYERS, C.M.G., M.D., M.R.C.P.

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EXPERIENCE has shown that scientific infant feeding should be made as simple as possible, and complicated formulas avoided. A clear conception of the guiding principles is essential if one is to attain success in infant feeding. Only the principles and a few facts have to be memorized. Caution has constantly to be exercised to observe any symptoms due to infection which may necessitate a distinct alteration in the method of feeding, we have likewise to remember that the infant weakened by digestive troubles may become a ready prey to infection. The digestive processes suffer, more or less, during an infectious disease, and tolerance being lowered the food must be reduced in strength temporarily.

Looking back on the experience gained from observations made on the feeding of several thousands of babies during the last twenty-five years, provides many practical deductions. Breast milk is easily first in promoting regular growth, satisfactory development, contentment, good health, high immunity to disease and perfect nutrition. If a mother has not sufficient milk to feed her baby, and it cannot be increased by regulating her life, giving more suitable food, allowing more rest, modifying her environment; or by massage, etc., of the breasts, the baby should be given either complementary or supplementary feeds for as long as is required. When the breast milk has failed, and weaning has to be done, a mixture should be given consisting of certified or grade "A" milk, water and



lactose or other sugar, in the correct proportions. Orange juice or grape juice, and cod liver oil must be given daily.

Modifications of the curd of cow's milk to aid its digestion can be done by diluting with cereal water, or by boiling the milk for three to five minutes, peptonization, use of alkalies (citrate of soda, lime water, bicarbonate of soda, or milk of magnesia), also by feeding with dried milk, condensed milk or with lactic acid milk, the curd of which is modified by the process of manufacture. Where a first-class fresh milk is not available, a good dried milk, either half- or full-cream, is invaluable.

In many instances excellent results are obtained by feeding small twins or premature babies, weighing  $2\frac{1}{2}$  to  $3\frac{1}{2}$  lbs, on full-cream non-sweetened condensed milk, or even the full-cream sweetened condensed milk, if properly diluted and prepared for feeding. Vitamins should be administered daily to all infants which are not breast-fed. It is usual to give sweet orange or grape juice mixed with an equal quantity of water and a pinch of sugar at 8 or 9 a.m. and cod-liver oil at 2 p.m. If the taste be objected to, White's cod-liver oil concentrate does excellently for babies as well as older children.

For each pound of body weight there are required  $1\frac{1}{4}$  to  $1\frac{3}{4}$  ounces of whole milk (average  $1\frac{1}{2}$  ounces) and 1 level teaspoonful of lactose or other sugar; this gives the correct amount of fat, protein, carbohydrate per pound of body weight for the 24 hours. Weak mixtures of cow's milk with water and sugar are sometimes necessary to commence with in the case of younger infants, so that from 1 ounce of cow's milk per pound of body weight, one will work up to  $1\frac{1}{2}$  ounces and, perhaps, later on,  $1\frac{3}{4}$  ounces, or even 2 ounces in some instances.

Underweight babies should be fed in accordance with their actual weight and digestion until their

tolerance increases, when the amount of milk per pound of body weight can be worked up gradually to  $1\frac{1}{2}$  ounces, and, later, 2 ounces or possibly more.

Two and a half ounces of fluid per pound of body weight in the 24 hours are necessary for infants up to the age of nine months, after which 2 ounces per pound is sufficient. Should the infant not receive sufficient water with his milk-mixture, extra water must be given between feeds; as to the quantity of food given at each feed, it can be stated, generally speaking, that an infant fed 3-hourly requires about an ounce more food at each meal than his age in months, and an infant fed 4-hourly, about 2 ounces more food than his age in months. Still, we know that individual babies differ in the quantity of food and water necessary for their daily requirements.

We have found that the majority of infants do best with six 3-hourly feeds during the 24 hours for the first four or six weeks of life, after which five 4-hourly feeds are given until the age of nine months. At the same time, a heavy, healthy baby, with plenty of breast-milk available, does better when fed 4-hourly from birth. Some weakly infants have to be fed 2-hourly for a time.

We believe that it is better to feed the infant with the correct amount of protein, carbohydrate and fat per pound of body weight than to feed purely by the caloric method. The latter, however, is invaluable in preventing over- or under-feeding. It is usual to allow 50 calories per pound of body weight in the 24 hours from the age of one to six months, and 45 up to nine months. Fat infants should be given a lower caloric value per pound of body weight than thin ones, who may require 55 or 60 calories, or even more, if able to digest the food properly. It is also necessary to remember the vital necessity of mineral salts to the body. Cow's milk contains more calcium and phosphorus than human milk, but the latter has

more iron. To remedy this defect in iron content in milk mixtures, it is a good plan to put 5 drops of raw egg-yolk in one bottle daily at one month (it very rarely disagrees) and work up to 30 drops between the third and fourth months.

Barley water is not infrequently given to young infants, but other cereals should not be introduced into the infant's dietary until it is five months old, when it can be put into one bottle daily, but it requires to be properly made and boiled for half an hour in a double saucepan before use. A vegetable soup is very useful about the sixth or seventh month, and can be introduced into the 2 p m feed, first 1 ounce and then gradually 2 ounces in place of an equal quantity of water.

During recent years *acid milks* have been much used in the treatment of certain difficult cases of infant feeding, and judging from my own experience better results have been obtained in the treatment of dyspepsia and athrepsia by such means than from any other method. Acid milks have also been proved valuable for complementary and supplementary infant feeding, or for weaning younger babies in perfect health.

The object of using acid milk is in the first place to neutralize the high buffer value of cow's milk, the acid normally present in the gastric juice being thus free for the ordinary purposes of digestion. According to Marriott, 0.4 to 0.6 per cent. of lactic acid, or the chemical equivalent of other acids, is the acid requirement necessary to curdle milk. The lower  $p^H$  not only increases the activity of the gastric juice, but probably helps also the motility of the stomach and in denaturizing the proteins. Other qualities credited to acid milks are aiding the opening of the pyloric orifice and possibly activating the secretions of the liver and pancreas. When the milk has passed to the duodenal side in the process of digestion, the acid prevents to some extent, according to most authorities,

the growth of harmful bacteria in the duodenum and jejunum.

As the degree of acidity approaches that when human milk is fed and digestibility greatly increased, acid milks can be taken undiluted in nearly all cases. For this reason there is less chance of underfeeding the child, there being greater caloric value per ounce than in an ordinary milk mixture. Therefore, in those children whose stomach capacities are small, acid milk is particularly useful, and also in those infants who vomit when too large a volume is taken. Thus in the case of the under-nourished infant whose capacity for digestion is low and caloric requirements high, it possesses qualities which are invaluable.

Another point of importance is that acid milks keep better than ordinary sweet milk, as bacteria grow less well in the acid milk mixture. Few babies object to the taste of acid milk, and we have not infrequently used it as a complementary or supplementary feed in those breast-fed, and usually without the infant objecting to the taste.

When given in the occasional cases with high acid content of the gastric juice acid milk may cause vomiting. Older infants who have been taking a sweet milk mixture may certainly object to the acid milk for a time, but this can generally be obviated by the use of an appropriate amount of sugar.

Other points in favour of acid milk are that the resulting curds being very small, fine bacteria are less likely to be enmeshed than by the larger curds formed from ordinary milk; the small soft curds are more easily penetrated by the gastric juice, and gastric digestion being more quickly accomplished the stomach contents pass sooner into the duodenum.

Some of the mineral salts such as those of calcium are rendered more soluble and absorption takes place readily. The decreased carbohydrate fermentation and the increased intestinal secretions render the

contents of the lower part of the intestine distinctly alkaline. It is believed that the acid base balance is not affected by organic acids.

Infants fed on acid milk have light brown, firm, putty-like stools. The odour is not objectionable generally, but sometimes slightly foul. The reaction is alkaline. A fair amount of lime soap and phosphate of calcium are present.

There are various ways of making acid milk, such as by the careful mixture of the requisite amount of any of the following: lemon-juice, orange-juice, pure citric acid, acetic acid (which makes smaller curds than lactic acid), hydrochloric acid, lactic acid B P., with milk, or by the inoculation of milk with pure cultures of *B. acidophilus*, or *Streptococcus lacticus*, or *B. bulgaricus*.

In making acid milk from bacteria such as *B. acidophilus*, the method briefly is to add a small amount of a pure culture obtained from a reliable laboratory, as the Lister Institute, to about 5 ounces of milk which has been previously boiled and allowed to cool. The milk thus inoculated is placed in a sterilized bottle, stoppered with sterilized cotton wool plugs and stood in a warm room for about 12 hours, when the milk should be curdled, indicating the activity of the culture. The next process is to add one tablespoonful of this culture-milk to one quart of good milk which has been boiled and cooled to 80° F. After mixing, it is poured into an absolutely clean bottle of a little over a quart capacity, covered with sterilized muslin, and stood over night in a warm place. Some people prefer to use a thermos flask, lightly stoppered with cotton wool plug, for this purpose. The incubation period must not be too long lest excessive acid formation result. Again, care has to be exercised not to allow the temperature of incubation to rise above the proper level, to prevent injurious bacteria from growing, and so spoil the milk by the formation of substances giving

qualities which make it unsuitable for acid milk feeding. Acid is produced from *Bacillus acidophilus* more slowly than in the case of *Bacillus bulgaricus*. The *B. acidophilus* is, however, more resistant to acid, and allows of a higher acid concentration in the milk. The *B. acidophilus*, when given in a milk mixture, is more likely to survive in the intestine than the *B. bulgaricus*, and more especially perhaps when dextrose is used.

It should be remembered that a suitable acid milk for infant feeding ought to be of a creamy consistence and show no separated whey, nor any large curds, nor bubbles of gas. The milk is unfit for use if any disagreeable odour or rancidity be present. We know of one case of a milk containing *Streptococcus lacticus* which had a foul smell and the whey had separated; unfortunately, the nurse gave it to a small child and serious toxic symptoms with severe diarrhoea resulted.

*Quantity of acid milk*.—The amount of acid milk given to an infant between the ages of one and six months, in good health, would be  $1\frac{1}{2}$  ounces per pound of body weight in the 24 hours, and to this would be added one level teaspoonful of sugar (preferably dextri-maltose) per pound of body weight. This equals roughly 30 calories per ounce of milk-mixture if the food be given undiluted, as it should be to babies in good health and to those who have sufficiently recovered from a digestive trouble. Some physicians allow the infant to take as much as it likes at each feed, but in dealing with a greedy child I am sure this procedure can lead to trouble from over-feeding. As infants require  $2\frac{1}{2}$  ounces of fluid per pound of body weight in the 24 hours, the extra water, if not added to the milk mixture, should be given to the baby between the feeds. Thus, a child weighing 10 pounds would be given 15 ounces of the acid milk in the 24 hours, the appropriate amount of dextri-maltose would be mixed with it and 10 ounces water if not added to the milk would be given

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diluted, can be treated with the lactic acid B.P. to make an acid-milk mixture. Some firms make a dried acid-milk powder which is quite useful in certain cases of infant feeding, the preparation has only to be mixed with the requisite quantity of water to be ready for use. Dried butter milk is also very useful and a good variety is obtainable.

In cases of enteral affection in infants I have found the routine use of acid milk invaluable and also in parenteral affections. In the latter case, however, it is necessary to discover the cause of the digestive symptoms outside the alimentary tract, whether it be throat trouble, otitis media, bronchitis or pychitis, which should receive the appropriate treatment.

I append a few examples of cases in which I have used acid milk —

*Case 1* — Baby aged 6 weeks, breast-fed. Mother's milk suddenly failed. Infant fed on dried buttermilk with dextrin maltose added. Orange juice and cod liver oil given daily. Baby progressed excellently. When 2 months old put on to an ordinary milk mixture. I have, during the last 2 years, in similar cases given lactic acid half cream milk instead of buttermilk.

*Case 2* — Baby aged 1 month, breast-fed. Mother's milk only sufficient for 3 feeds in 24 hours. Half-cream lactic acid milk with dextrin maltose added given for the 3 supplementary feeds and well taken. Orange juice and cod liver oil administered. Excellent result.

*Case 3* — Baby aged 7 weeks, admitted to hospital weighing 8 lbs 2 ozs. Birth weight 10 lbs 4 ozs. First fed on breast milk, then half cream dried milk, next a whole cream dried milk and, as it did not agree, full-cream condensed milk. Vomiting and diarrhoea present on admission and temperature 99.5°. Stools green, foul and curdy. Water only administered for 6 hours, then dried buttermilk with dextrin maltose, and, of course, orange juice and cod liver oil. Weight curve straightened out and vomiting and diarrhoea ceased, appetite improved, and general condition became satisfactory, and increase of weight occurred. A half-cream dried milk now given alternately with the butter milk, and, a few days later, alone, with 5 to 10 drops of fresh yolk of egg added to one bottle daily. Weight on leaving hospital at end of fortnight was 10 lbs. (See Chart David M.) This child had, before admission to hospital, been given too much and too strong food.

*Case 4* — Baby aged 10 weeks, admitted to hospital with frequent stools. Put on sterilized water only for 12 hours, then



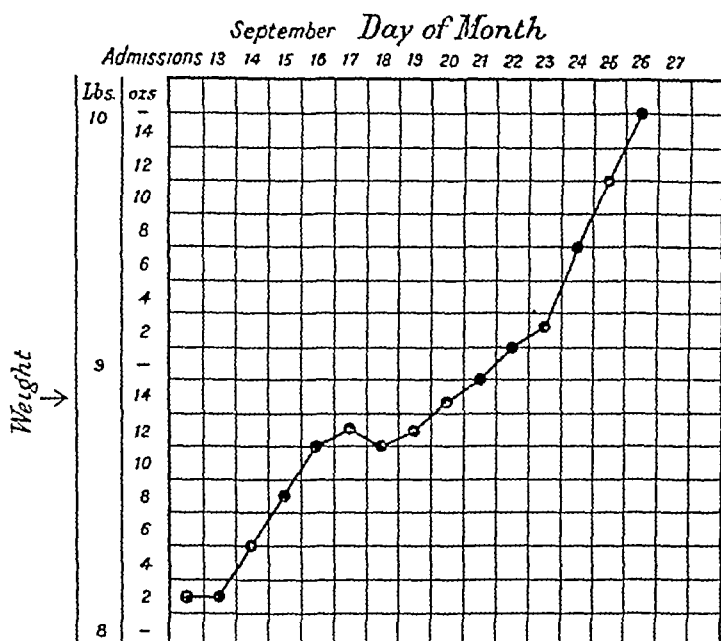


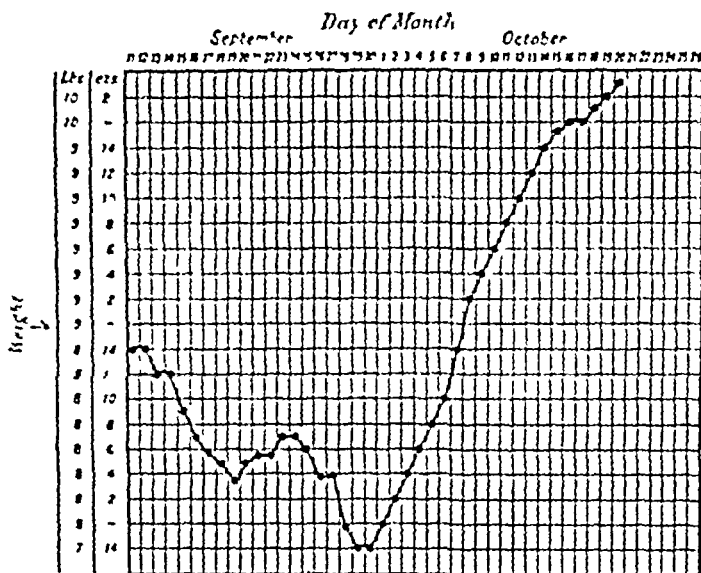
FIG 1—David M 12 9 31 Water only 6 hours Dried buttermilk with dextrin-maltose Orange juice and emuls. of morrhuae  
 20 9 31 Cow and Gate half cream dried milk alternately with buttermilk. Liq paraffin for bowels as required At first 7 feeds in 24 hours, then 6 feeds  
 25 9 31 Half cream dried milk only, with yolk of egg added to one bottle Also orange juice and emuls. of morrhuae.  
 In perfect health and nutrition

dried buttermilk, usual amount orange juice and cod liver oil Weight fell from 8 lbs 14 ozs to 8 lbs 4 ozs, and then increased to 8 lbs 7 ozs, when again a fall in weight, and in a few days 7 lbs 14 ozs The temperature was now about 100° daily, a fair amount of mucus was seen in the stools, and obvious pain noted, and tenderness in descending colon and sigmoid Irrigation of the colon was therefore carried out twice daily, the buttermilk with dextrin-maltose being continued at first alternately with a dried milk, then the latter alone Weight now rose rapidly, child gaining about 2 ozs daily, and in 3 weeks' time weighed 10 lbs 4 ozs, the temperature having been normal for over 2 weeks (See Chart Edward R.) With symptoms of colitis appearing, irrigation of colon was soon followed by gain in weight

This case shows necessity of starting treatment all over again when symptoms recur.

The following is an example of the necessity for persevering with the treatment in certain difficult cases, notwithstanding the occurrence of relapses.

Case 5—Phyllis C aged 5 weeks, admitted to hospital with



- Fig 2—Edward R 11 9 31 Sterile water only  
 12 9 31 Dried buttermilk  $\frac{3}{4}$  in with dextrin maltose  $\frac{3}{4}$  ss, 6 three hourly feeds  
 15 9 31 *Streptococcus lacticus* milk  $\frac{3}{4}$  ss, water  $\frac{3}{4}$  ss, dextrin maltose  $\frac{3}{4}$  ss  
 Ol morrh conc 2 tablets daily, and orange juice  
 16 9 31 Lactic acid milk B P  $\frac{3}{4}$  in, water  $\frac{3}{4}$  ss, dextrin maltose  $\frac{3}{4}$  ss  
 Ol morrh conc 2 tablets daily, and orange juice  
 29 9 31 Dried buttermilk (1-10)  $\frac{3}{4}$  iv, dextrin maltose  $\frac{3}{4}$  i, ol morrh conc 2 tablets daily, and orange juice  
 2 10 31 Dried buttermilk (1-10)  $\frac{3}{4}$  ivss, dextrin maltose  $\frac{3}{4}$  i, ol morrh conc 2 tablets daily, and orange juice  
 9 10 31 Dried buttermilk (1-10)  $\frac{3}{4}$  ivss, dextrin maltose  $\frac{3}{4}$  i alternately with Cow and Gate (H C)  $\frac{3}{4}$  iv, ol morrh conc 2 tablets daily, and orange juice  
 15 10 31 Dried milk (H C)  $\frac{3}{4}$  ivss alone

history of vomiting, stated to be sometimes projectile Birth weight  $8\frac{1}{2}$  lbs, and weight on admission 8 lbs No hypertrophy of pylorus felt Patient put on water only for 6 hours, then a half-cream dried milk, but vomited, therefore a weak cow's milk, water and dextrin-maltose mixture, boiled for 5 minutes, tried, but vomiting continued At this time child developed broncho-pneumonia, from which it made a slow recovery Buttermilk and dextrin-maltose mixture was used directly the temperature rose, and continued for 6 weeks until weight curve straightened out Weight began to increase until 12th week, when it fell again, and dried milk which had been used for a week was stopped and butter milk with dextrin-maltose given again Weight rose steadily, though with occasional falls, which were much better seen in daily chart than weekly one shown here, but after 20th week there was a continuous daily rise (a half-cream dried milk was at this point substituted for lactic acid milk) until at 7 months infant weighed 12 lbs During its stay in hospital, the infant was given orange juice and cod liver oil daily Until infant was 5 months old, vomiting was apt to occur if even the

slightest change was made in the strength of the milk mixture. The bowels were not infrequently loose for 2 to 3 days at a time,

*Each square represents one week in hospital.*

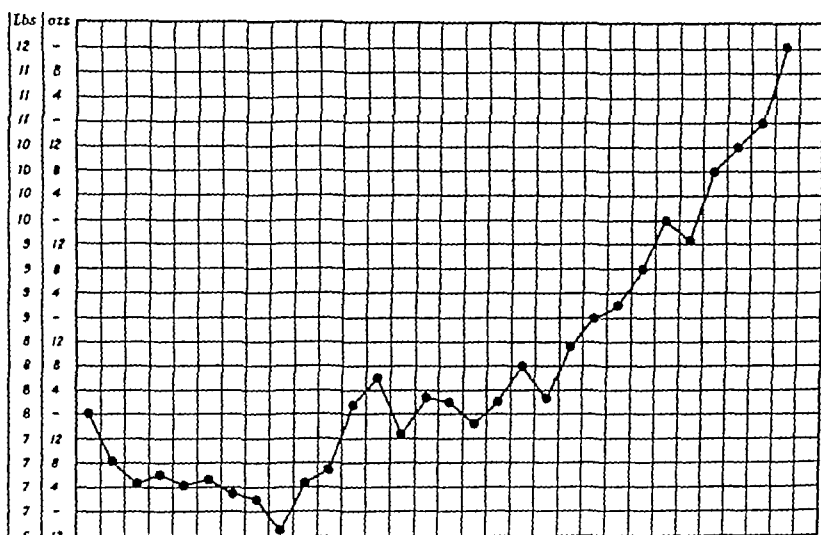


FIG 3—Phyllis C, age on admission to hospital, 5 weeks, on discharge, 34 weeks. Weight at birth,  $8\frac{1}{2}$  lbs, weight on admission to hospital, 8 lbs. Case of marasmus.

and this condition sometimes accompanied slight rises of temperature. The W R was negative. Since leaving hospital, infant was given a dried milk first, and then a cow's milk mixture, orange juice and cod liver oil as before. The usual additions to the feeding were made between 8th and 9th months, and when 12 months old this child, which had caused so much anxiety, was not far short of the normal weight for its age and enjoyed perfect health.

One final word on the importance of doctors writing down all instructions regarding the infant's food, for one mistake by the nurse or mother may be followed by serious consequences. Further, all ingredients should be accurately labelled. Recently an infant was given a milk-mixture containing, in error, boric acid instead of sugar-of-milk, severe vomiting and diarrhoea resulting with unconsciousness. Fortunately the child made a good recovery.

# Cardiac Arrhythmias:

## Their Effect on the Operative Risk

By T JENNER HOSKIN, M D , M R C P

*Physician and Cardiologist to the Royal Free Hospital, Honorary  
Cardiologist to St Paul's Hospital*

THE presence of cardiac irregularities is of interest to all surgeons, and it is of increasing importance to assess accurately the cardiovascular condition prior to operation, since by this means the surgeon and the anæsthetist are made cognizant of the increased risks, if any, with which they may have to contend, and also the nature and extent of the operative procedure can be decided on. One of the most difficult problems likely to confront the surgeon is cardiac arrhythmia. He can recognize that the heart rhythm is not normal, but is unable to decide in the majority of cases as to the nature of the arrhythmia or its significance.

To understand properly the significance of cardiac arrhythmias we must go back to the primitive cardiac tube of early foetal life. At this stage the heart consists of a single tube continuous in front with the two primitive aortæ and behind with the veins. The venous or posterior extremity is the most excitable part of the tube, and it is here that the wave of contraction begins. The remainder of the tube has the power of initiating the wave of contraction, though to a lesser degree, but if any part becomes more excitable than the sinus or venous extremity the wave of contraction commences at that part. Normally, the wave of contraction is initiated at the sino-auricular node, which is the most excitable part of heart tube and is situated in the wall of the right auricle just

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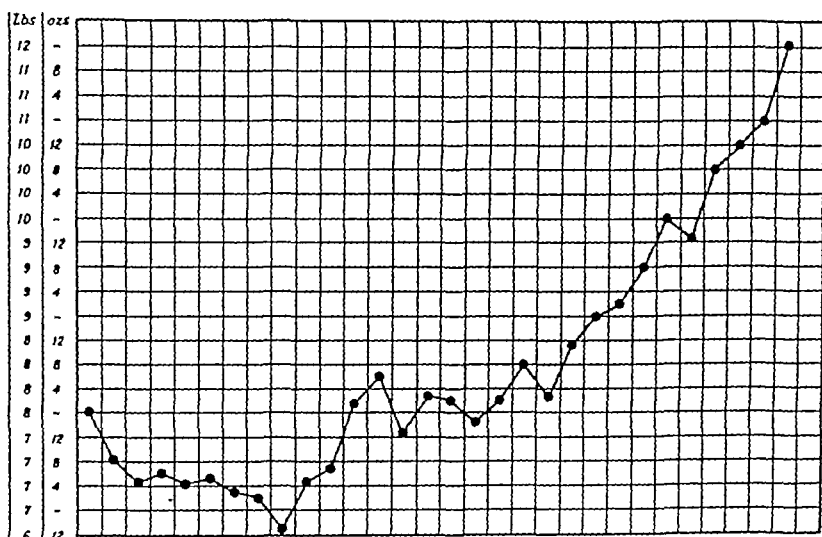


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inhibition of the excitability of the sino-auricular node during the expiratory phase.

Sino-auricular block is an uncommon condition, in which the normal excitability of the sino-auricular node is so decreased that from time to time the heart may miss a complete beat. Frequently it presents no symptoms, but in others there may be a transient feeling of giddiness. It is probably caused by inhibitory impulses from the vagus. The significance of the condition depends on the intensity of the symptoms. As a rule these are absent or slight, and thus the condition would not affect the operative procedure.

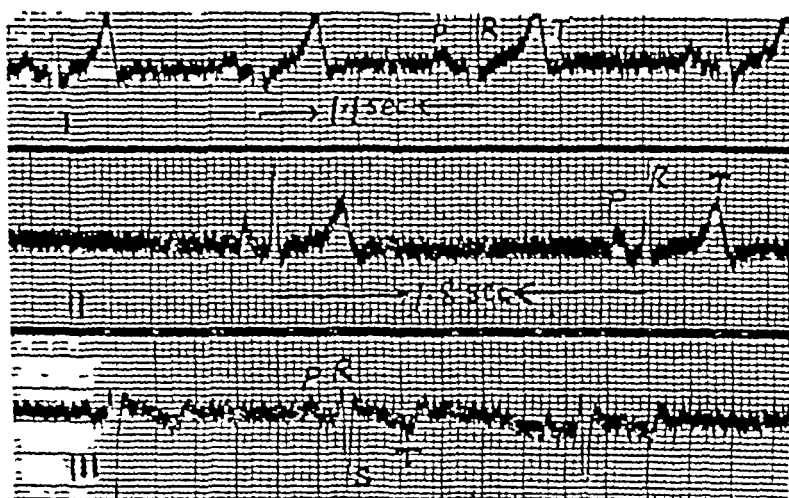


FIG 1—A case of sino auricular block occurring in a woman aged 32. She complained of breathlessness and faintness on exertion, but had no signs of gross failure. The condition persisted in spite of all treatment, though it did not progress.

As has already been stated, the most excitable part of the heart is the sino-auricular node, and this excitability gradually diminishes as we pass onwards. Thus, the auricular muscle is more excitable than the ventricular. If a contraction originates from any part of the heart other than the S. A. node it is known as ectopic. An ectopic beat may, therefore, arise anywhere

in the heart outside the S.A. node, i.e. from the auricles, either of the ventricles, or from the auriculo-ventricular nodal or junctional tissues

An ectopic beat may be brought about by any factor causing either decreased excitability of the S.A. node or increased irritability of any part elsewhere in the heart. Ectopic beats are one of the commonest causes of cardiac arrhythmia. They often occur unbeknown to the individual, though others may complain of a "dropped beat" or a "fluttering" sensation of the heart. There are two main medical opinions as to their significance. One school maintains that the presence of ectopic beats is of no consequence whatever, whereas the other looks upon their occurrence as of some moment. In my opinion neither school is correct. An ectopic beat denotes a hyper-irritable focus in some part of the heart away from the S.A. node, and the significance depends entirely on the underlying factors which have brought this about. Ectopic beats may be conveniently divided into two main groups: (1) *Extrinsic*, and (2) *Intrinsic*.

*Extrinsic* are those brought about by some factor outside the heart itself and may occur both in normal and diseased hearts. They are usually right ventricular in origin. One of the commonest predisposing factors is increased intra-abdominal pressure. Right ventricular ectopic beats are, therefore, not infrequently found in women with normal hearts during the later stages of pregnancy, and are of no significance as regards the heart's integrity.

*Intrinsic* premature beats arise owing to some condition of the heart itself. One of the commonest causes is a toxic myocarditis. They are also frequently found in cases of myocardial embarrassment, either as the result of chronic valvular disease or of degenerative changes, and their significance then depends on the results of the clinical and the electrographic findings.

One can make a definite statement, however, that

the advent of ectopic beats in a person with myocardial disease is a serious phenomenon, and is a sure indication of a fatigued heart muscle. It is frequently followed by auricular fibrillation later on. The presence of ectopic beats in an elderly man with enlarged prostate requiring surgical treatment, requires careful consideration as to the nature and extent of the operation and how much his heart will stand. Again, the significance of intrinsic ectopic beats will depend on their site of origin in relation to the cardiac condition. By this I mean that auricular premature beats, in a case of mitral stenosis, indicate auricular fatigue, and one may expect the early occurrence of auricular fibrillation unless proper treatment is forthcoming. Again, right ventricular ectopic beats, in a patient with right heart embarrassment, as shown by the presence of dyspnoea and cyanosis, indicate a further stage towards failure of compensation. Further, left ventricular premature beats, in patients with cardiovascular degeneration associated with raised blood pressure, are an unfavourable sign and early evidence of myocardial failure.

Alterations in the heart-rate are often a source of difficulty in assessing operative risk. I have already mentioned sinus arrhythmia and S.A. block, but bradycardia and slow pulse-rate at times present considerable difficulties of interpretation. There is a physiological type of bradycardia which is often found in athletes. The heart-rate is usually under 60 at rest and may even in a few cases be found below 50. The heart-sounds are strong, but there is no enlargement. The heart's response to exercise is interesting. The rate, instead of rising gradually as in normal people, remains stationary for a time and then suddenly doubles itself. Naturally, physiological bradycardia is of no significance, but must be recognized from two other conditions.—

(1) A slow pulse due to ectopic beats alternating



with the normal beats, these ectopic beats failing to reach the radial pulse. Synchronous auscultation over the præcordium will show the presence of ectopic beats in the intervals between the radial pulse beats. Again, on raising the heart-rate by exercise, the ectopic beats will disappear and there will no longer be a difference between the apical and radial rates.

(2) A slow pulse due to partial or complete heart block may be at times difficult to determine. Occasionally, even complete heart block is present with a pulse-rate as high as 60, though it is normally under 40. The response of the heart to exercise is pathognomonic of the condition. In complete heart block there is no increase of the heart-rate, though the heart itself beats more forcibly.

Incomplete heart block may be mistaken, and often is for an irregular rhythm due to occasional ectopic beats. Careful listening over a heart at the same time as palpation of the radial pulse will show an absence of the ventricular beat synchronous with the

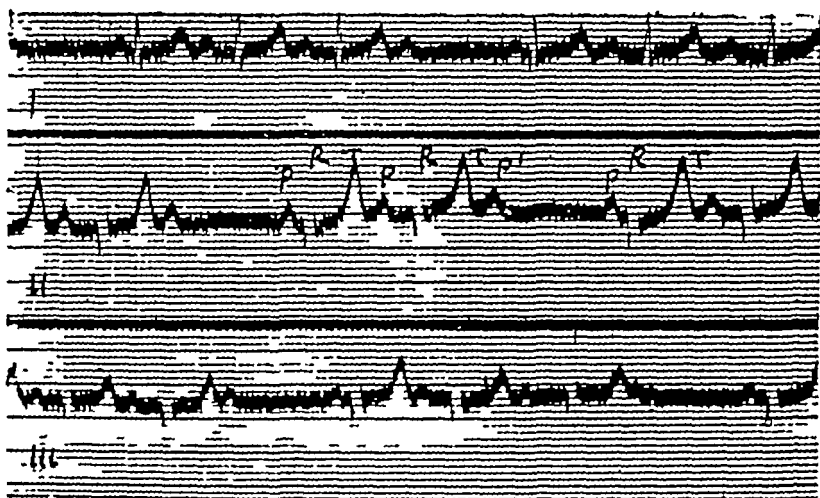


FIG. 2.—A case of active rheumatic carditis in a boy aged 12. The record shows a partial heart block with failure of ventricular response every third or fourth beat. On his recovery normal rhythm was re-established.

missed radial pulsation. Heart block, both partial and complete, indicates serious myocardial damage, and contra-indicates all operations other than those of dire necessity. Stokes-Adams syndrome, in which there is a cessation of ventricular contractions for some seconds with the probability of syncope, is a very serious complication of heart block and is the usual mode of death in this condition.

There are two types of arrhythmias in which the auricles no longer contract normally as a whole, but the contraction wave spreads in what is called "a circus movement" from one muscle bundle to another. They are known respectively as auricular flutter and auricular fibrillation. In auricular flutter, the circus movement is slower and runs along a definite path, the wave of contraction spreading from one bundle to the next in an orderly manner. Thus, the auricular contractions varying between 250 to 350 per minute, occur regularly, and there is also a definite ventricular rhythm, which may be regular or irregular, slow, medium or fast, depending on the response of the a-v node to the auricular stimuli. It is not a common condition and when found is usually associated with valvular or myocardial disease. The rhythm tends in time to change into auricular fibrillation.

In auricular fibrillation the muscle bundles are smaller and the contraction wave no longer spreads in an orderly manner, so that the ventricular rhythm becomes completely irregular. The auricular contractions are themselves irregular and more rapid than those found in auricular flutter, the usual rate being round about 450 per minute.

Auricular fibrillation is comparatively common. There are four main conditions in which it is commonly found. (1) Acute fibrillation, (2) Secondary to mitral cyanosis; (3) Toxic myocarditis; (4) Myocardial degeneration.

(1) In *acute infections* in which the heart muscle

is severely poisoned, auricular fibrillation is liable to occur and is an indication of a failing heart muscle, and, thus, is a most unfavourable sign. The diseases in which it is most likely to occur are . pneumonia, diphtheria and rheumatic fever.

(2) Auricular fibrillation occurs in the later stages of *mitral stenosis* as a result of auricular overaction and fatigue. Mitral stenosis is the commonest cause of auricular fibrillation. Its presence is usually associated with congestive failure, but fortunately in digitalis we have a drug by whose means we can control the ventricular rate and thus in many cases prevent the occurrence of heart failure, or restore the heart's function when already present

(3) Auricular fibrillation is not uncommonly found in patients with *myocarditis*, the best example being *Graves' disease*. In 366 cases of Graves' disease which I analysed two years ago I found auricular fibrillation in 10 per cent. of cases. This percentage is probably on the low side, since there must have been many cases in which the auricular fibrillation was transient and, therefore, not present at the time of examination. Removal of the greater part of the diseased thyroid gland tended to restore normal rhythm in over 50 per cent. of these cases.

(4) Auricular fibrillation is not uncommonly found in elderly people with *myocardial degeneration*, in whom sclerosing changes have taken place in the heart muscle. It tends to come on insidiously, and is frequently found without any marked exacerbation of symptoms. As a rule it requires very small amounts of digitalis to keep the ventricular rate controlled. Its presence, however, is an indication of a generalized myocardial disease. This is usually associated with high blood pressure, and occurs in people well past middle life. It is thus not uncommonly found in prostatic patients. It naturally makes the operative risk very much more serious.

Again, there is arrhythmia due to paroxysmal tachycardia. In this condition there is a history of rapid heart beating of sudden onset, lasting from a few minutes to several hours, and often accompanied by symptoms of cardiac distress. The ventricular rate is usually above 140, and sometimes, over 250. It may occur in patients whose hearts appear normal to the ordinary clinical examination, and in those with myocardial or valvular disease. The onset and termination of attacks are abrupt. This condition may be brought about by short or long runs of ectopic beats, arising from any part of the heart.

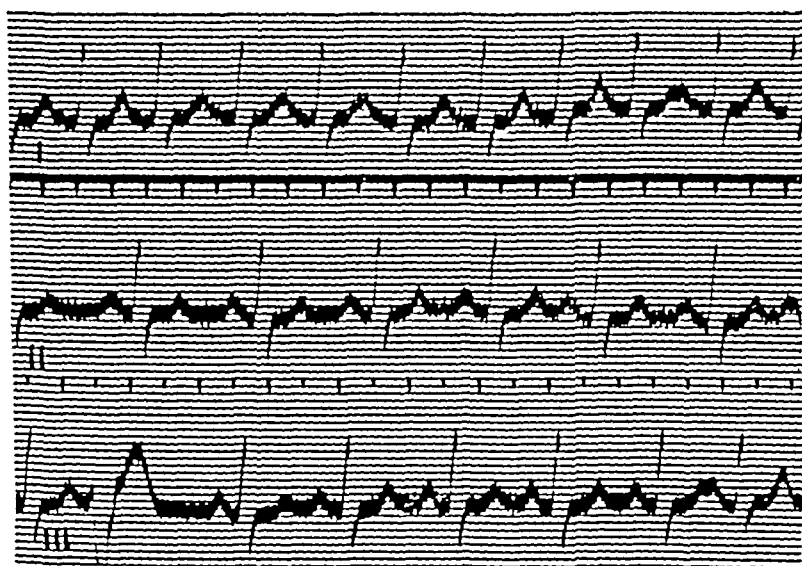


FIG 3—A record of a patient aged 36, showing paroxysmal tachycardia arising from the auricles. A left ventricular premature beat is seen in lead III.

Paroxysmal tachycardia, due to a run of ventricular ectopic beats, is more serious than the auricular and nodal types. Congestive failure will occur if the attack lasts longer than a few minutes. Paroxysmal tachycardia may also be caused by auricular flutter and by auricular fibrillation, and these paroxysmal attacks frequently precede the onset of permanent

while with the other groups, though such complications may occur, they are infrequent. The *Streptococcus mucosus* gives rise to a characteristic condition: Acute inflammation of the middle ear occurs and quickly clears up or apparently does so; in about 50 per cent. of the cases the membrana tympani remains intact or the discharge may be trifling, quickly drying up and the drum membrane returning to normal. The patient seems quite well except for some deafness and tinnitus, but after an interval of three months an intracranial complication occurs.

*Congestion of the mastoid antrum.*—Pain and tenderness over the region of the mastoid antrum does not necessarily imply suppuration. A large mass of adenoids, septic inflamed tonsils or nasal obstruction may set up tubo-tympanic congestion with extension into the antrum. Such patients, in addition to giving usually a history of frequent colds, post-nasal catarrh and sore throats from time to time, complain of deafness, tinnitus and pain behind the ear.

*Acute antral suppuration.*—It is generally accepted that in most cases of acute otitis media, more especially when the attic is involved, the mastoid antrum shares in the inflammatory condition. When the disease is confined to the atrium—in other words, the lower half of the tympanic cavity—the mastoid antrum is not affected. When, on the other hand, the disease extends to the attic, or when the attic is primarily attacked, the inflammation spreads through the aditus into the mastoid antrum. A patient with acute antral suppuration secondary to attic disease first complains of pain in the ear. The onset is not so sudden as when the lower tympanic cavity is primarily affected. It gradually increases in intensity until there is well-marked pain and tenderness on pressure over the antrum. The pain is described as of a deep and boring character, the patient does not experience any great relief immediately the drum ruptures or is incised.

There is deafness, tinnitus, and the temperature may reach 102° F., and in young children is usually higher. At this stage nothing is to be found externally over the mastoid, the disease being confined to the mucous membrane lining the antrum, the bone being unaffected. On examining the drum in the early stage before suppuration has taken place, there is very little to be seen. There may be some reddening and injection of Shrapnell's membrane, and perhaps the upper border of the membrana tensa. At a later stage, when pus has formed and is under pressure in the attic and antrum, the redness spreads down the drum membrane and there are signs of bulging at first of Shrapnell's membrane, and later the entire membrana tensa. In favourable cases the ear begins to discharge freely a day or two after rupture has taken place or paracentesis has been performed. The earache and mastoid pain and tenderness subside and the case under the most favourable conditions and appropriate treatment may dry up, or in less favourable circumstances become one of chronic suppurative mastoiditis.

*Acute suppurative mastoiditis*—This condition is an acute suppurative inflammation usually starting in the middle ear and thence spreading into the mastoid process. The mastoid antrum is first invaded and then the infection spreads in turn to the cells and, finally, the walls of the bone itself. As in all suppurative conditions elsewhere, there is the first stage of congestion and infiltration, which passes next to the stage of pus formation and, finally, osseous necrosis.

Clinically suppurative mastoiditis may be divided into two main groups: (1) acute, and (2) chronic. Each of the groups may be classified for descriptive and diagnostic purposes according to the type of mastoid present—namely, (a) pneumatic, (b) diploic, (c) sclerotic. It is very important to bear these forms in mind, because symptoms and signs which are easily recognized in the cellular type of mastoid and

either an extra- or intra-dural abscess, leptomeningitis or temporo-spheroidal abscess. Again, as in the diploic type, in addition to the general condition of the patient, the appearance of the postero-superior quadrant of the drum membrane and the corresponding part of the auditory canal and any marked change in the aural discharge must be carefully noted. Pain, tenderness, insomnia, and rise of temperature must warn one that operative interference is needed.

*Other varieties of acute mastoiditis.*—Before passing from acute suppurative mastoiditis mention must be made of the following varieties, which usually occur in the pneumatic mastoid: (1) *Bezold's mastoiditis* is the name given to suppuration of the mastoid when the pus perforates the thin inner plate at the tip of the mastoid process and tracks down the neck beneath the sterno-mastoid muscle or between the layers of the deep cervical fascia. In such cases the outer plate of bone is extra thick, while the inner plate is exceedingly thin, and some large cells are usually to be found in that area. A large oval swelling is seen in the neck, below and behind the mastoid, and if mastoid trouble is not suspected it might puzzle one as to what it was. Usually, however, there are other signs of mastoid disease. The trouble in these cases is to ensure adequate drainage. (2) *Zygomatic mastoiditis* occurs when the mastoid cells are well developed and extend forward into the root of the zygoma. As these cells are present to a certain extent normally in both the pneumatic and diploic bone, it is important that when operating in suppurative mastoiditis, they should be well opened and removed. When the cells of the zygoma are involved there is swelling with tenderness and pain in the front of the ear. The swelling gradually increases and spreads upwards until it is limited above by the insertion of the temporal muscle and, below by the temporo-mandibular joint. It may spread forwards until the orbital cellular tissue is involved; this becomes

œdematous, and in some cases the patient is unable to open the eye.

*Mastoiditis in infants and young children.*—The diagnosis of this disease is very difficult in the early stage and very often it is only when a sub-periosteal abscess has formed or marked post-auricular œdema is seen that acute mastoiditis is suspected. In infants and very young children one is unable to differentiate between tympanic and antral pain, as both cavities are small and practically one, so that pain due to tympanic suppuration may be referred to the antrum. Again, fever is most unreliable, as a second rise in temperature may be due simply to a recurrence of the middle-ear condition which may have subsided temporarily. Other signs and symptoms, such as vomiting and convulsions, while making one anxious, should not be regarded so seriously as if occurring in the adult, because the cerebral centres are not so well under control in the young child. Nevertheless, when such symptoms are noticed, other signs should be looked for and the child kept under observation with a view to surgical intervention if necessary.

*Chronic mastoiditis.*—The patient with chronic mastoiditis usually comes for treatment for chronic suppuration in the middle ear, and it is then that the question arises: "Is the mastoid involved?" and if so, "Is it a case for the radical or some modification of the radical mastoid operation?" In some cases the entire membrana tensa may be destroyed and the ossicles may be exposed and partly necrosed; the latter especially applies to the long process of the incus, which has a poor blood supply. In other cases a marginal perforation may be present, and this, with the presence of granulations, indicate bone necrosis. It is also in this latter type that cholesteatomatous disease may occur, which is a certain indication for the mastoid operation. Caries of the ossicles, of course, may occur alone, but it should make one look also for



caries of the mastoid. Very often X-ray examination may give some information as to the condition of the bone. The discharge is usually foetid where caries is present, and polypi and granulations may be found in the tympanum or through a fissure in the posterior meatal wall

When any of the foregoing conditions exist, and the patient gives a history of occasional attacks of pain and tenderness over the mastoid, with giddiness constant or intermittent, and if these are accompanied by rise in temperature and pulse-rate, one may be confident that one is dealing with a case of chronic mastoiditis and that operation is necessary. In sclerotic mastoids the disease may be dormant for years and cause little or no symptoms beyond perhaps a deep, boring pain at times, and in some cases not even that. The disease may progress unknown to the patient and even cause a temporo-sphenoidal abscess of the chronic type without showing any signs of its existence until an acute attack supervenes and causes rupture of the abscess with fatal consequences

With regard to the type of operation to be performed, that will depend entirely on the exact conditions found by the surgeon during the course of the operation. What may be indicated in one case may not suit another, and *vice versa*. Then, again, there are some who use a skin graft to line the cavity left after the radical operation, while others use a muscle graft to fill up the cavity. One point must be remembered, no matter what type of mastoid operation is performed, the original source of the disease, whether in the nose or throat, must be attended to, and septic tonsils, adenoids or sinus disease must be removed to ensure a cure.

# Practical Notes

## *Pulmonary Tuberculosis.*

Dr. R. R. Trail, the Medical Superintendent of King Edward VII Sanatorium, Midhurst, has issued, with the statistical help of Mr. D. Stockman, an elaborate report on the experience of the patients at the Sanatorium with particular reference to their mortality after treatment. In 1919, Dr. Noel Bardswell and Mr. H. R. Thompson, F.I.A., brought out a report upon the mortality after the sanatorium treatment from its opening in July 1906 until 1914, the patients being kept under observation until 1914 or their earlier death. The present report, based on the same principles, carries on the results from July 1 to June 30, 1928, the after-history of the patients being followed up to the anniversary of discharge in 1929 or their earlier death. The patients are divided into three groups—the early, moderately advanced, and advanced stages, as adopted by the Association for the study of the Prevention of Tuberculosis in America, and the following terms are used to describe the condition on discharge—"arrested," "much improved," "improved," "stationary" and "worse." Whereas 28 per cent of all cases showed "arrest," group one showed 68·7 per cent, group two only 23 per cent, and group three 4·6 per cent, this proves the value of treatment in all early stages and the justification for continuing treatment only in the first two stages. Of cases with tubercle bacilli in the sputum, the percentages of arrest in the three groups were 47·7, 14·8 and 2·7 respectively. The tables of the after-history show that, as compared with expected, deaths to be higher for as many as ten years after discharge, the presence of tubercle bacilli in the sputum and of laryngeal tuberculosis naturally exert adverse effects on the mortality which do not disappear with lapse of time—(Special Report, price 2s, published by the Council of King Edward VII Sanatorium.)

## *Artificial Pneumothorax*

Dr. T. N. Kelynack, the editor of the *British Journal of Tuberculosis*, which now begins its twenty-sixth year of activity, must be warmly congratulated on the results of his long and successful labours. In the January number of this journal Dr. L. S. T. Burrell has given a critical survey of the modern conception of artificial pneumothorax in the treatment of pulmonary tuberculosis. Although suggested by James Carson in 1822, and employed forty-five years ago for the relief of hæmoptysis by that great clinician, William Cayley, physician to the Middlesex Hospital, it has been generally employed in this country for less than twenty years. It is sound both in theory, namely, rest to the affected lung, and in its practical results, for it has completely changed the prognosis in pulmonary tuberculosis. In spite of this a large number of medical men, many of whom have never seen a case so treated, regard it as a drastic and experimental procedure. The methods of this form of treatment have been modified in the course of time, formerly the affected lung was kept completely collapsed by large refills of 1,200 c cm or even more, but now small refills and partial collapse

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of the lung is the more usual procedure, and from this has arisen the practice of inducing partial collapse of both lungs simultaneously or by not collapsing the second lung until the first has been allowed to expand. Dr Burrell, however, has been disappointed by the results of bilateral artificial pneumothorax, it certainly may prolong life for a short time, but usually with a severe degree of invalidism. It is now a common practice to induce collapse of one lung and to give sanocrysin to control the spread of the disease in the other lung, and in many cases this succeeds better than simultaneous collapse on both sides. The complications of artificial pneumothorax have been reduced, it is very rarely that the pleural cavity becomes infected by other micro-organisms in artificial pneumothorax, this is nearly always due to ruptured lung and the outlook is then very grave. Phrenic evulsion and oleo-thorax are of value in certain cases in combination with artificial pneumothorax — (*British Journal of Tuberculosis*, 1932, January, xxvi, 28)

### *The Treatment of Bone and Joint Tuberculosis.*

A Dale points out that whatever the local procedure, it is on the general treatment that we depend for the cure of the local as well as of the general disease, in tuberculosis of the bones and joints. Prognostication of the final result with regard to the possibility of restoring function is of the greatest value in enabling us to judge as to the best line of treatment to be adopted in a given case, with reference particularly to the advisability or otherwise of undertaking any surgical interference which will entail permanent fixation. Rest forms the foundation of the purely local treatment. The affected part must be rigidly immobilized for four reasons: (a) Absence of movement allows the healing process to go on undisturbed, (b) firm fixation in good position prevents the development of deformity, (c) absence of friction minimizes the risk of abscess formation, (d) firm union of bone, if this is desired, is prevented by movement. Immobilization may be secured by external splinting or by operative fixation. Deformity must be prevented. This entails a careful and persistent watch over the progress of the case. Any laxity in the method of immobilization will almost certainly permit of the development of deformity. Great care must be exercised in preventing the production of secondary deformities by the treatment. In the treatment of hip disease, for instance, drop-foot, hyper extension of the knee, and scoliosis may readily develop if they are not assiduously guarded against. Abscesses must be controlled by aspiration, particularly because of the potential danger of sinus formation and secondary infection. The scheme of treatment must be coloured throughout by efforts to secure permanency of the healing — (*Edinburgh Medical Journal*, March, 1932, xxxix, 140)

### *The Clinical Aspects of Intravenous and Retrograde Pyelography*

F S Patch and W L Ritchie say that if it was ever thought that intravenous urography would supplant retrograde pyelography, such has been proved to be erroneous, and it is rapidly finding its proper

place as a supplement or complement to the older method and other associated diagnostic aids in urological diagnosis. Although at times one or other method will give the most information, both methods have a definite value as adjuncts to accurate urological and X-ray diagnosis. Urological diagnosis can be made but rarely by the use of any one method. It is only by the most careful summation and co-ordination of all factors—the case history, the general physical and special examinations, laboratory tests, cystoscopy, and the X-rays, that a thoroughly sound diagnosis is attained. There is a danger that in relying on excretion pyelography alone, except in certain cases where only gross information regarding the kidneys is required, essential and necessary procedures are omitted and faulty or incomplete diagnoses are the result—(*Canadian Medical Association Journal*, February, 1932, xxvi, 154)

### *The Treatment of Pneumococcal Peritonitis*

C. Achard reviews the subject of pneumococcal peritonitis, and points out that although the treatment of the condition—namely, laparotomy and drainage—is well recognized and adopted as the general rule, yet it is not always carried out, and deaths from pneumococcal peritonitis are not infrequently recorded. He discusses a number of instructive cases which ended fatally, and suggests that the reason why surgical intervention had not been carried out in them was because the condition had not been recognized as peritonitis. On examining a case of pneumococcal peritonitis the abdomen is not found to be rigid or board-like, a point which is usually regarded as important with reference to the indication for operation. But although the abdomen is supple and yielding in these cases, there is nevertheless a certain resistance to pressure present, which can be observed if careful examination is carried out. Early operation is essential for the cure of pneumococcal peritonitis—(*Journal des Praticiens*, February 26, 1932, xlv, 113)

### *The Prognosis in Heart Block.*

L. B. Ellis presents an analysis of 43 cases of complete auriculo-ventricular block in patients ranging in age from 9 weeks to 78 years. Seventy per cent. of the patients were over 40 years of age, and the same percentage were males. In 29 cases the block was permanent, while in the remainder it was intermittent or temporary. Fifty-two per cent. of the cases of permanent block were due to arteriosclerosis, 31 per cent. were of undetermined origin, but in most of these instances they were probably either congenital or dependent upon an acute infection. Diphtheria, syphilis and rheumatic infection were responsible for a small number of cases. Digitalis was the chief etiological agent producing transitory block, although arteriosclerosis and infections caused a lesser proportion. Complete heart block *per se* may exist for very prolonged periods of time without damaging the health of the patient. Four cases are recorded by the author in which the block is known to have existed for 24, 15, 14 and 7 years respectively, and two more in which it has almost certainly lasted 9 years—(*American Journal of the Medical Sciences*, February, 1932, clxxxiii, 225)

# Reviews of Books

*Diseases of the Thyroid Gland with Special Reference to Thyrotoxicosis.*

By CECIL A. JOLL, M.S., F.R.C.S. London: William Heinemann (Medical Books), Ltd., 1931. Pp. xvii and 682. Coloured plates 24, figures in the text 283. Price £3 3s.

IN 1901, Sir James Berry, Surgeon to the Royal Free Hospital, brought out his well-known work *Diseases of the Thyroid Gland and their Surgical Treatment*. Since then an enormous amount of research and new knowledge on the subject has been forthcoming, but no complete survey has appeared in this country. Mr Joll, now senior surgeon to the Royal Free Hospital, has supplied this want in a volume remarkable for its record of personal observation, acquaintance with the literature, and wealth of admirable illustrations. Beginning with accounts of the anatomy and physiology of the thyroid, a specially important preliminary in this instance, a corresponding account is given of the parathyroids, as they were formerly thought to be embryonic or resting portions of the thyroid. The diseases of the parathyroids do not come within the scope of this monograph. In the interesting description of Riedel's disease it is pointed out that in 1884, fourteen years before Riedel's article appeared, Sir Anthony Bowlby reported a case under the title "infiltrating fibroid tumour of the thyroid gland", among more than two thousand thyroidectomies Mr Joll met with eight cases of this condition and tabulates their main features. After a full discussion of thyro-glossal tumours and cysts and of simple goitre, illustrated by a number of maps, cretinism and myxoedema are summarized. New growths of the thyroid all receive minute attention, and in considering the question of the reality of primary sarcoma the author concludes that genuine cases do occur, and mentions that among his twenty-one cases of malignant thyroid tumours there were three sarcomas. Thyrotoxicosis is divided into primary or exophthalmic goitre and secondary or toxic adenoma. The elaborate account of Graves's disease commences with the reproduction of the original description given by Caleb Hillier Parry of Bath, whose portrait forms the frontispiece of the volume. In the discussion of the as yet unsettled cause of exophthalmos reference is made to Foster Moore's failure to find Müller's smooth muscular fibres in the dissection of some hundreds of orbits, and the conclusion is reached that if they do occur they must be far too feeble to cause proptosis. The treatment, medical and surgical, is very fully given, the latter being generously illustrated. In conclusion this splendid monograph, which is obviously the outcome of many years' work by the author who wrote on the subject as far back as 1910, must long remain the source of reference on the subject.

*Chest Disease in General Practice, with Special Reference to Pulmonary Tuberculosis.* By PHILIP ELLMAN, M.D., M.R.C.P. General Practice Series. London: H. K. Lewis & Co., 1932. Pp. xv and 266. Illustrations 132. Price 15s.

THIS is a well-written and admirably illustrated summary of pulmonary and pleural disease. The sections on the diagnosis,

prognosis and treatment of pulmonary tuberculosis are those of high practical and of particular value from the close co-operation between the author and Dr. Stanley McVail in connection with the recognition of radiological appearances. Correlation of the clinical, radiological, and post-mortem data leads to the conclusion that the annular shadows—at one time described as "pleural tags" or even occasionally as localized pneumothorax—are almost always due to cancer, though from a clinical point of view they may be silent. The indications and contraindications for the use of tuberculin are given, the former being to stimulate healing by fibrosis and to increase the patient's resistance. The treatment of non-diabetic tuberculous patients by insulin is admittedly in an experimental stage, and the author rightly points out the care that must be taken in this method. There is a very good account of asbestosis, with an excellent coloured plate of the golden yellow bodies found in the sputum. There is also a concise description of byssinosis or the clinical symptoms caused by cotton dust, and the subject of moniliasis is illustrated by the record of a case and a skin-gram. The illustrations and especially the skiagrams for which the author expresses gratitude to Drs. Stanley McVail and Cordner are of a high order of merit.

*Report of the Medical Research Council for the Year 1930-1931*  
London: H.M. Stationery Office. Pp. 153. Price 2s. 6d.

ALTHOUGH few out of the seventeen years of the Medical Research Council's existence have yielded a better harvest of results, the financial strain, quite apart from the national crisis, last year, has increased. In a service relatively young the expenditure must rise as the workers receive increments of pay, and for the last four years the grant-in-aid voted by Parliament has not been increased. In common with similar administrative and research services under the Crown, those working under the Council have sacrificed a portion of their remuneration temporarily. As in previous years, this report shows that the research work promoted by the Council has had useful relations at many points to other Government Departments. The widespread activities of the Council, which have done so much in advancing knowledge during and since the war, are set out and provide a most interesting summary of recent and current work, thus under the heading of new advances in nutritional science an account is given of a crystalline compound with constant and very high vitamin D activity, provisionally named "calciferol," which, weight for weight, has 400,000 times the value of a good sample of cod liver oil in preventing or curing rickets. An ounce of calciferol, dissolved in suitable liquid, could provide the necessary daily ration for more than a million children. (See also *THE PRACTITIONER*, Jan. 17, 1932, cxxviii, 96.) The investigation of new remedies is being actively carried on, a Therapeutic Trials Committee has been established, and a long list of clinical workers entered by the Council is given in the section headed "External Research Schemes." It is obvious how much Medicine thus owes to the Council and its Secretary, Sir Walter Fletcher.



*The Diagnosis of Nervous Diseases* By SIR JAMES PURVES-STEWART, K C M G, C B 7th edition London Edward Arnold and Co, 1931 Pp viii and 734 Illustrations 311, of which 20 are coloured Price 35s

THE first edition of this popular work came out in 1906 and that it meets a constant demand is shown by its having been translated into French, German and Spanish, and by the necessity for a seventh edition. It is not intended to be a textbook for neurologists but as an introduction to the subject and, as its title implies, to facilitate the recognition of the causes responsible for a patient's symptoms and disabilities. The present edition has been thoroughly revised, many additions and changes made, especially in the introductory chapters, dealing with anatomical and physiological principles, and a number of new illustrations have been added. Among the changes necessitated since the last edition in 1924 those in the section on aphasia may be mentioned.

*The Clinical Interpretation of Aids to Diagnosis*, Vol II London The Lancet, Limited, 1931 Pp vii and 342 Full plates 30, 22 Figs in text Price 10s 6d

THE first volume, reviewed in these columns in November, 1930, cxxv, 656, is now followed by a collection of articles by 25 experts in various subjects. Radiological interpretation is considered in a number of well-illustrated articles. Dr A E Barclay gives an account of the alimentary canal from the œsophagus to the sigmoid flexure, Drs Burrell and Stanley Melville deal fully with intrathoracic diseases and provide a large number of beautiful radiograms, and Mr C Bowdler Henry interprets the appearances of dental films. These articles insist on the importance of basing a diagnosis on a correlation of the clinical with the radiological data. The information to be derived from microscopical and chemical examination of the blood is given in another series of articles. Dr W S Patterson, of Ruthin Castle, sums up what can be learnt from microscopical investigation of the faeces, a subject also touched on by Dr G A Harrison when elucidating the chemical tests of pancreatic efficiency. Dr John Freeman writes authoritatively on idiopathic skin reactions and Mr Kenneth Walker on the tests of sterility and fertility in the male. Each article is headed by a brief summary, and separated from the next by a blank page for the reader's memoranda.

*Diseases and Disorders of the Digestive Organs* By ADOLPHE ABRAHAM, O B E, M D, F R C P Pocket Monographs on Practical Medicine London John Bale, Sons and Danielsson, 1932 Pp 110 Price 2s 6d

THIS is the first of a new series of very handy small volumes, edited by Mr Arnold Soreby and Mr Maurice Soreby, which are cheap and easily carried about, so that the reader can utilize them when travelling or at any spare moment. In this volume, the dyspepsias are classified in the manner adopted by Dr J A Ryle in 1926, which is described as "almost beyond criticism." Much stress is laid on the importance, from a diagnostic point of view, of

an accurate clinical history—by no means an easy task—but it is, of course, not less essential that a careful physical examination should be carried out. Flatulence is, in the vast majority of cases, due to air-swallowing, and attempts at eructation commonly result in further aerophagy. Appendix dyspepsia, the form due to chronic cholecystitis, peptic ulcer, dilatation of the stomach, and gastric carcinoma are all sketched in clear language.

*Wheeler and Jack's Handbook of Medicine*. Ninth edition. Revised by JOHN HENDERSON, M.D., F.R.C.P.S. Edinburgh. P and S. Livingstone, 1932. Pp. xix and 651. Illustrations 34. Price 12s. 6d.

SINCE its first appearance in 1894, and especially since 1903 when it was edited by the late Dr W. R. Jack, this concisely written textbook has been a favourite with students, particularly in Scotland and the North. Now under the careful supervision of Professor Henderson it bids fair to continue its reign of popularity. Convenient in form it is a *multum in parvo* of up-to-date medicine, clearly written and well arranged. Beginning with introductory chapters on fever in general and on immunity, the specific infectious diseases, metabolic disorders and the vitaminoses are summarized, and then the diseases of the various systems of the body, commencing with the alimentary canal and ending with the nervous system are passed in review.

*The Essentials of Bacteriological Technique*. By R. F. HUNWICK, B.Sc. London. Williams and Norgate, 1931. Pp. 108. Illustrations 22. Price 6s. 6d.

THIS is a practical guide and is based on the personal experience of a whole-time bacteriological worker. Beginning with a description of the necessary laboratory equipment, it contains chapters dealing with the examination of milk and milk products, water, meat and canned foods. It will, therefore, as Dr W. G. Savage points out in a brief introduction, be specially useful to those engaged in laboratories where much of the time is devoted to Public Health Work.

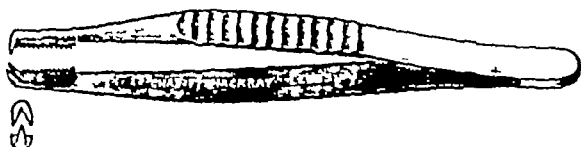
*Individual Sexual Problems*. By F. G. CROOKSHANK, M.D., F.R.C.P. Psycho Miniatures, Medical Series, No. 11. London. Kegan Paul, Trench, Trubner & Co., 1931. Pp. 150. Price 2s. 6d.

THE volume, well-informed and interesting, as all that Dr Crookshank writes, contains three lectures delivered within the last three years, and is dedicated to Alfred Adler, with whom the author largely agrees in attempting to reconcile the freedom and strength of the individual with the demands of society. The teaching of individual psychology, in which the author is a firm believer, is set out and its relation to Freudism and psycho-analysis discussed. Individual psychology regards the sexual difficulty as one of the three great problems in life—subsistence, society and sex—whereas the Freudians insist on what is known as pan-sexualism.

# Inventions and Preparations

## COMBINED DISSECTING AND SUTURE-HOLDING FORCEPS

Mr Lancelot Bromley, M Ch, F R C S, writes The following diagram shows an instrument designed for use as an ordinary toothed dissecting forceps, as well as for the purpose of holding and



keeping taut suture material during a continuous stitch, and while tying knots The suture material may readily be grasped and held firmly between the evenly approximating surfaces without damage being caused The instrument was made for me by Chas F Thackray, Leeds, and of 252, Regent Street, W 1

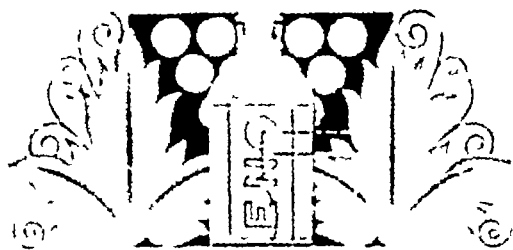
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**ABERNETHY, W R M.B., B Ch Belf., D.P.H.,** appointed Superintendent M.O.H., Executive Sanitary Officer Schools Medical Officer and Tuberculosis Officer of Londonderry

**ADAM, R E, MRCS, L.R.C.P.** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital

**ARNOTT, D., M.B., Ch B Edin.,** appointed Certifying Factory Surgeon, Shaftesbury

**BAND, D, M.B., Ch B Edin., F.R.C.S. Edin.,** appointed Assistant General Surgeon, Hospital for Diseases of Women, Edinburgh.

**BATTLE R J V, M.B., B Ch.,** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital.

**BEAVER R A, B.M., B Ch.,** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital.

**BICKNELL, F. B.M., B Ch.,** appointed Casualty Officer and Resident Anaesthetist St Thomas's Hospital.

**BROCKMAN, R St L, M.Ch., F.R.C.S.,** appointed Medical Referee under Workmen's Compensation Act for Doncaster and East Rotherham County Court District (Circuit No 18)

**CRAMFRI, P V, MRCS, L.R.C.P.,** appointed Certifying Factory Surgeon New Southgate District Middlesex.

**FITZWILLIAMS DUNCAN C L, C.M.G., M.D., F.R.C.S.,** appointed Consulting Surgeon Paddington Green Children's Hospital

**GALLOWAY, T McLAREN, I.R.C.S.** appointed Medical Referee under Workmen's Compensation Act for Clackmannan County (Sheriffdom of Stirling Dumfries and Clackmannan) vice C. Ferguson, M.B. C.M. resigned

**JOHNSTON D M, M.D. Darh.,** appointed Hon. Medical Officer in charge of Artificial Sunlight Dept. West Kent General Hospital

**LINDAHL, J W S H M.B., B Ch.,** appointed Casualty Officer and Resident Anaesthetist St Thomas's Hospital

**MILL, W A M.S., F.R.C.S.** appointed Assistant Surgeon in the Ear, Nose and Throat Department St Thomas's Hospital

**MYLCHREEST W H, M.R.C.S., L.R.C.P.,** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital

**NEILSON, D F A, F.R.C.S.,** appointed Assistant Surgeon in the Ear, Nose and Throat Department, St Thomas's Hospital

**OLIVER C PYT, Jnr, M.B., B Chir Camb.,** appointed Honorary Assistant Physician, West Kent General Hospital

**OVFREND, H F, MRCS, L.R.C.P.** appointed Certifying Factory Surgeon for the Blackpool District, Lancaster

**POOLER, H F, M.B., Ch B St And.,** appointed Honorary Anaesthetist Chesterfield Royal Hospital

**ROBERTS, A, M.B., Ch B Edin.,** appointed Certifying Factory Surgeon for the Lornadoc District Carnarvon.

**RUSBY, N L, B.M., B Ch.,** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital.

**SEARS, E H, L.R.C.P. Lond., M.R.C.S.** appointed Certifying Factory Surgeon Lyndhurst

**SPENCE, J H, M.B., B Ch.** appointed Casualty Officer and Resident Anaesthetist, St Thomas's Hospital

**STRATFORD, MARTIN G, M.R.C.S. L.R.C.P.,** appointed House Surgeon at University College Hospital for 6 months commencing April 1st.

**SUTHERLAND, W D, M.B., Ch B Glas.,** appointed Certifying Factory Surgeon for the Fyvie District, Aberdeen

**TAYLOR, DOROTHY M, M.B., Ch B Edin.,** appointed Maternity and Child Welfare Officer, Sunderland Council.

**THOMAS OLIVER F, I.R.C.P. Lond., M.R.C.S., D.P.H.,** appointed Tuberculosis Officer Sunderland Council.

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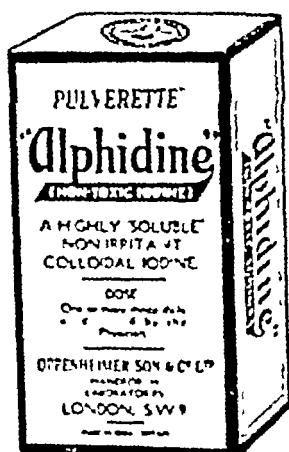
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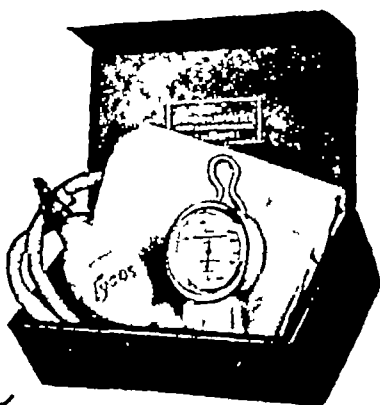
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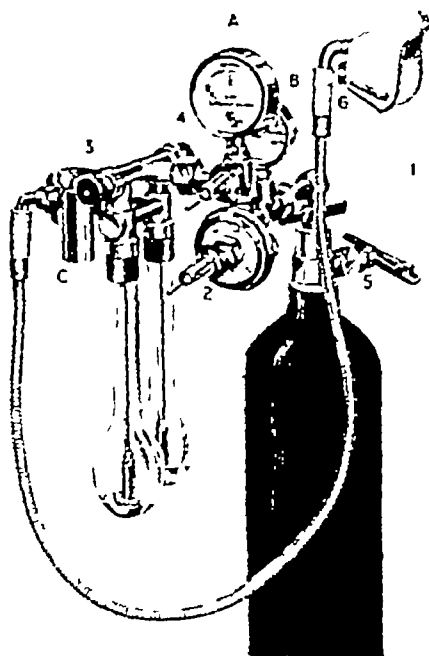
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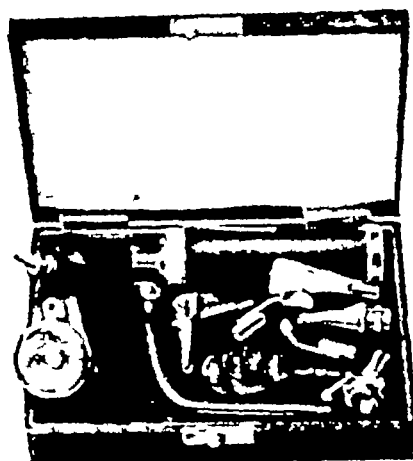
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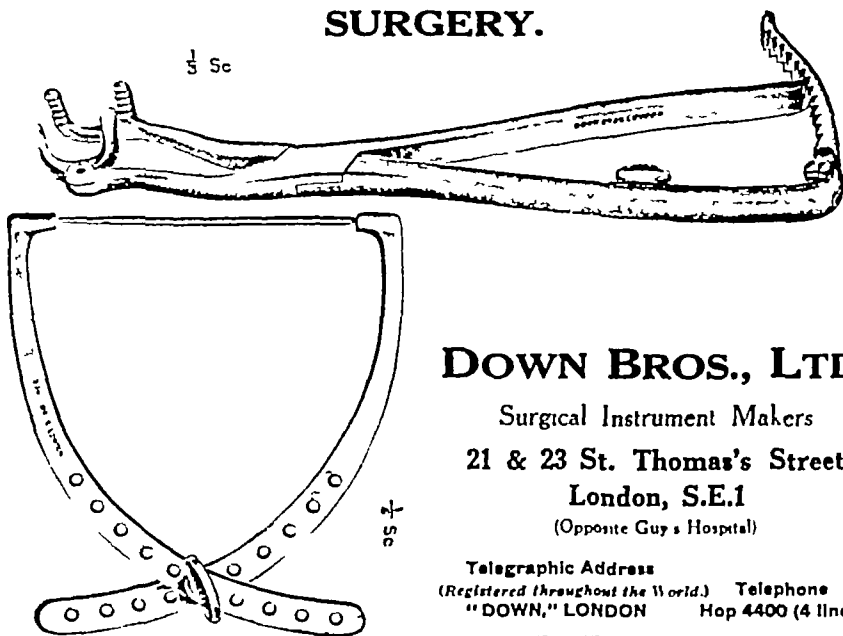
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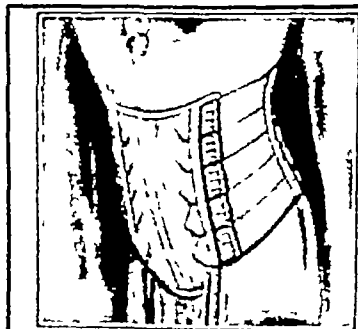
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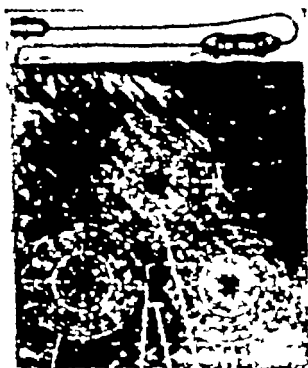
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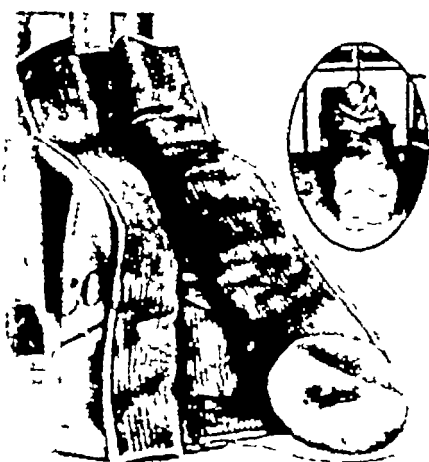
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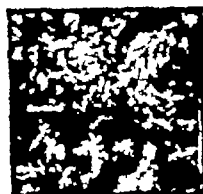
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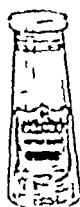
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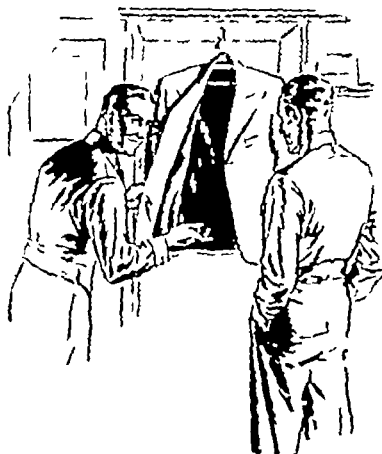
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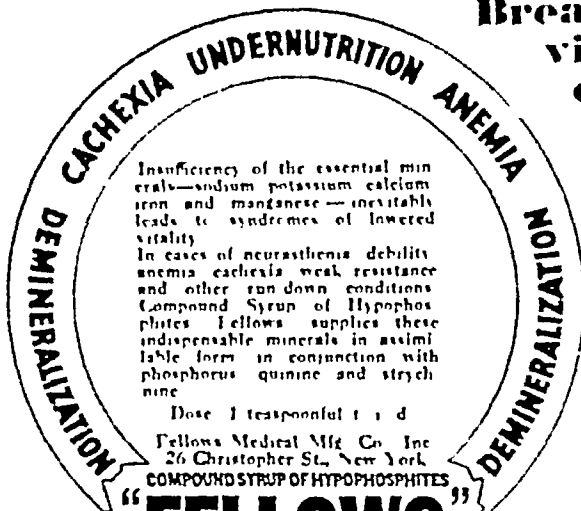
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Prescribed with marked effect in Neuralgia, Migraine, Sciatica and Neuritis, they may also be employed with benefit in Rheumatic Affections. They control the Headache and Myalgic Pains of Influenza and exert a definite antipyretic action in febrile conditions. Antikamnia does not depress the heart nor derange the digestion.



### Antikamnia with Codeine Tablets

afford prompt relief in Post-Influenzal Cough. They allay the laryngeal irritation, the distressing paroxysms then cease.

*Antikamnia  
Tablets and  
Antikamnia  
with Codeine  
tablets are  
supplied in  
100 packages*

### THE ANTIKAMNIA REMEDY CO.

*Generous Samples sent Post Free by the sole Distributors  
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## A Marked Advance in Scientific Pharmacy

*Ensures the reinvigoration of the Organism and the Incapsulation of Biliary Lesions*

**PULMO** unlike the old-fashioned pharmaceutical preparations of phosphates and calcium which were not assimilated but passed through the body unchanged contains these mineral substances in the ionized state (introduced by Prof. Stephane Leduc and Dr. V. Bouchet). Consequently they are eminently active, and ready to form stable combinations with the constituent elements of the organism. **PULMO** is indicated in common colds, Catarrh, Influenza, Laryngitis, Tracheitis, Bronchitis, Asthma, Pneumonia and all Pre-Tubercular conditions.

**PULMO** has a world-wide reputation among medical men, as a most efficient combination of those principles which act specifically on the diseased tissues and morbid secretions of the Respiratory Tract.

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VIRGINIA CIGARETTES

10 for 8<sup>p</sup> 20 for 1/4 50 for 3/3



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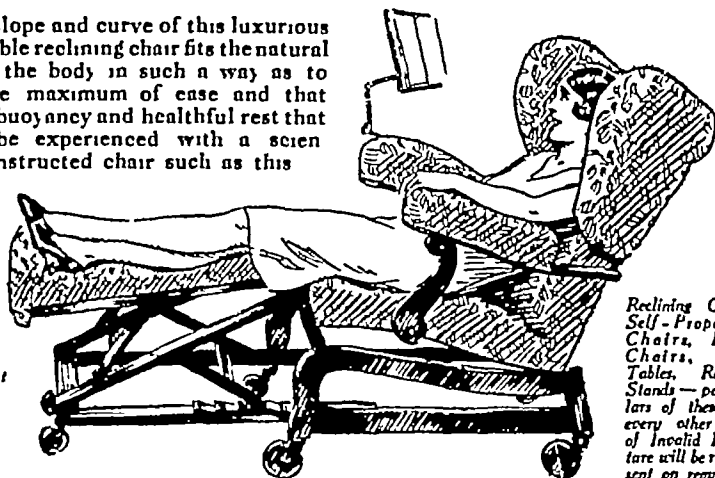
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**E**ACH slope and curve of this luxurious adjustable reclining chair fits the natural outline of the body in such a way as to procure the maximum of ease and that wonderful buoyancy and healthful rest that can only be experienced with a scientifically constructed chair such as this



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When metabolism—the conversion of food into vital force—is disturbed there is an excessive accumulation of uric acid and urates in the blood-stream and tissues. Gout, rheumatism, recurrent migraine, hepatic engorgement, constipation, lassitude, pyorrhæa alveolaris and kindred manifestations of the retention of waste substances form the chief indications for SALVITAE.

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SALVITAE increases the alkalinity and uric solvent power of the blood, prevents the over-production of nitrogenized materials, augments the elimination of effete substances, invigorates capillary circulation; stimulates renal activity; promotes biliary secretion, dispels languor and creates a state of general well-being

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Sole Agents in the United Kingdom

# Salvitae

Two sizes

4/6 and 7/-

USUAL MEDICAL DISCOUNTS

Manufactured by American Apothecaries Co., New York.



**Inspection  
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welcomed**

The visits of medical men are especially welcomed at the countryside factory where Shredded Wheat is made. Doctors will appreciate the significance of each operation by which the wheat berry is made into a digestible food without adding or taking anything from it. Steam cooking, shredding and baking, dextrinise the starch, while the bran is

retained in fine particles.

The factory is open to inspection without preliminary notice every day (except Saturday and Sunday). A trip to Welwyn Garden City is well worth while, and no one who is in the neighbourhood should miss the opportunity of witnessing the manufacture of Britain's favourite cereal food.

# SHREDDED WHEAT

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“Opocaps” PROSTATIC (B.O.C.), gr. 3.

Rx Mitte . . . . sig. 1 t.d.s., a.c.  
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Rx Also in 2 c.c. ampoules for hypodermic injection  
“Opojex” PROSTATIC (B.O.C.)  
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An eminent Urologist has written —

‘It is not surprising that the success of organotherapy in the treatment of other diseases has induced the hope that sufferers from enlargement of the prostate might benefit by the use of an extract of prostatic gland. Various preparations are at the present day on the market, and testimonials to their efficiency are not lacking. Personally I have given a trial to the prostatic extract prepared by the British Organotherapy Co., and certain patients suffering from early enlargement have assured me that they have definitely benefited from the use of this preparation.’

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# Macfarlan's Anæsthetic Ether

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represents the acme of purity, reliability and stability. That this claim is being increasingly recognised is demonstrated by the chart showing the striking growth of our sales during the last six years.

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## *In Gastric and Intestinal Diseases* *Sanatogen has no Counter-Indication*

"When there is gastric trouble with vomiting or sickness, Sanatogen is, in my experience, the best of artificial foods, easily retained and easily assimilated" writes an author in the "B M J"

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Sanatogen is not only a concentrated food substance and regenerator, but also a physiological nerve tonic. Its combination of casein and glycerophosphate of sodium gives it an advantage over other food preparations, the nerve-cells themselves being nourished by the phosphorus it contains.

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Part I deficiency of Vitamin B is more common than was realised until conclusive researches demonstrated its wide incidence. It may be suspected wherever there is a derangement of the gastro-intestinal function, Nervous Debility, Neurasthenia, Rheumatism, and, especially in children, impairment of growth, Anorexia, and lowered resistance to infection.

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BEMAX is a preparation of the detoxicated embryo of cereals, carefully stabilised to provide a bland, tasty food, easy to prepare and readily assimilated. It contains 500 units of Vitamin B (complex) per ounce (Sherman method).

Vitamin B cannot be stored within the system. BEMAX may be fed

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ANTIPNEUMOCOCCAL SERUM

Types I & II CONCENTRATED (FELTON)

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The Original Preparation  
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## The Safest Local Anæsthetic for all Surgical Cases

Ample supplies of Novocain are available for the use of Surgeons at all the chief Hospitals. Specify "Novocain" for your next operation.

Does not contain Cocaine, and does not come under the Dangerous Drugs Act

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for the treatment of GLAUCOMA according to  
Dr Carl Hamburger (Berlin).

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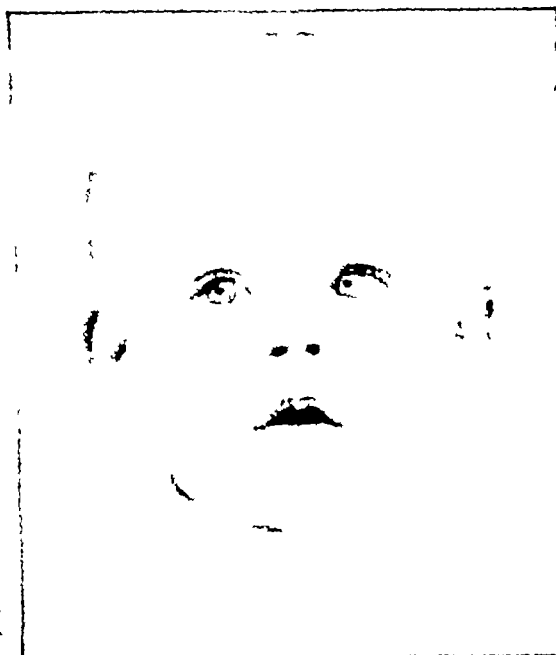
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## Carbohydrate content as in Breast Milk

Ordinary liquid cow's milk is considerably deficient in carbohydrates. Ordinary dried milk is also usually below the physiological requirements in this respect.

In preparing Lactogen, the liquid milk is fortified with natural milk sugar—the sugar most suitable for infant feeding—to bring it up to normal breast milk standard.

Lactogen is a modified dried milk for use in infant feeding—prepared in England by Nestlé's, from the rich, pure milk of selected English herds.

FREE SAMPLES  
with detailed de-  
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will be sent to any  
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BETTER MILK FOR BABIES

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March 31st, 1932

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I am much obliged for your letter re Posterisan therapy. As a matter of fact since I got your first notice on this subject some two years ago I have prescribed it frequently, invariably with striking success. Whereas all other ointments and suppositories are merely palliatives, I have found that Posterisan Suppositories used with Posterisan Ointment have definitely cured many cases of hæmorrhoids to the satisfaction of my patients and my own gratification.

Yours faithfully,

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## SUPPOSITORIES

and

## OINTMENT

for the treatment of

# Hæmorrhoids

The active principle of Posterisan Suppositories and Ointment is a Vaccine prepared from a pure culture of *Bacillus Coli*. They contain neither chemicals nor drugs, and even prolonged use does not lead to habit.

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Product of the Laboratories, Dr Kade, Berlin. Manufactured  
in full accordance with the Therapeutic Substances Regulations

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# To correct flatulence and indigestion

The dry condition of Vita-Weat, the British whole-wheat crispbread, is of distinct advantage in cases of flatulence, in which moist foods are largely contra-indicated, and the crispness and hardness of the slices ensures proper mastication and thorough salivation of the food bolus which is rendered completely assimilable by the gelatinization of the starch granules and the thorough disintegration of the roughage content. Vita-Weat combines the nutritive and health-giving properties of the best wholemeal bread with the palatability of the white loaf. The whole of the wheat berry is used in its preparation, and the manufacturing process—which conserves all the vitamins—is entirely physical and thermal. Analysis gives the following comparison with wholemeal bread:

	Vita-Weat (The Larger)	Wholemeal Bread (The Usual)
Moisture -	4.90	45.00
Protein -	10.32	6.30
Fat -	7.90	1.20
Carbohydrates, etc.	74.28	46.30
Mineral matter, ash, etc.	2.60	1.20
	<u>100.00</u>	<u>100.00</u>
Calorific Value per lb.	1846	1105

Here, then, are all the foodstuffs essential to vigorous health, with the roughage required to stimulate natural peristalsis without undue irritation of the intestinal mucous membrane.

Vita-Weat is entirely British—made by a British firm with British labour, [of only  $\frac{1}{4}$  British wheat, British-milled and British-baked]

# Vita-Weat

REGD.

THE BRITISH WHOLEWHEAT CRISP BREAD

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Made by

PEEK FREAN—Makers of Famous Biscuits





# Peptonised Chicken Jelly

(BENGER)

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(BENGER)

The new all-glass container in which these jellies are packed, ensures that they reach the invalid in perfect condition.

Served in their jelly state with a few biscuits, or dissolved in hot water in "beef tea" form, these preparations make a valuable and easily assimilated restorative for weak digestions


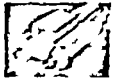
**NOTE** — *Peptonised Chicken Jelly and Peptonised Beef Jelly (Benger) are entirely free from preservatives.*




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# WE MODERNS PREFER

electric lights  to old oil lamps

 and motor cars  to the

horse and gig  of an earlier

age  because we get results

more quickly and more efficiently.

Similarly in constipation — a modern day has developed a modern way — AGAROL To meet every modern need, this product combines efficiency with palatability No oily taste, no artificial flavouring to get used to

*AGAROL Brand Compound is the original mineral oil and agar-agar emulsion with plerolphthalein It softens the intestinal contents and gently stimulates peristalsis*

Effectiveness must be experienced  
A supply gladly sent for trial

## AGAROL *for Constipation*

BRAND COMPOUND

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*Prepared by WILLIAM R. WARNER & CO., INC., Manufacturing Pharmacists since 1856.*

THE  
COLLOSOL  
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A very remarkable addition  
to our equipment for dealing  
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BRITISH MEDICAL JOURNAL  
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Indicated in boils,  
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deep seated coccogenic  
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Special attention is drawn  
to the advantages of the  
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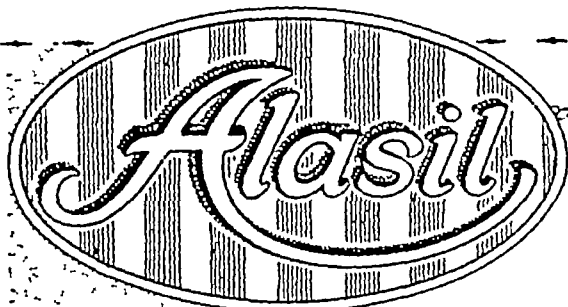
# General Treatment of Eye Diseases

It is the accepted thought amongst leading ophthalmologists that the eye is highly sensitive to intestinal poisonings, which often cause premature hardening of the lens and loss of accommodating power. As a mechanical evacuant, 'Petrolagar' meets the requirements of these cases without any disadvantages or contra indications.

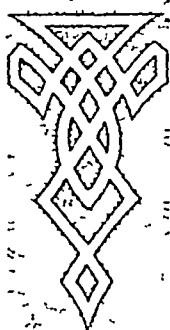
'Petrolagar' brand paraffin emulsion mixes intimately with the contents of the bowel, lubricates and softens the mass. It provides a comfortable and easy motion without any straining effort.

*Specimens and interesting literature  
sent free on application to*

PETROLAGAR LABORATORIES LTD  
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# Analgesic Antipyretic Sedative



*A supply for clinical  
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sent free on request*

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Acetyl-salicylic acid possesses a notable disadvantage. Physicians have proved that it cannot be tolerated by patients suffering with a delicate stomach. Consequently, the value of this medicament in the wide field in which it is indicated is very seriously reduced.

"Alasil" completely overcomes this objection. By combining calcium acetyl-salicylate with "Alocol," unfavourable secondary action upon the stomach is prevented. This beneficial influence is undoubtedly due to the presence of "Alocol" (Colloidal Hydroxide of Aluminium), which preparation has brilliantly stood the test of practice in the treatment of hyperacidity and other ill-conditions of the gastric tract.

"Alasil" is therefore a triumph over acetyl-salicylic acid. It enables higher doses to be administered and maintains the patient's system under its influence for a greater length of time. Analgesic, Antipyretic and Sedative, "Alasil" is indicated in all cases where acetyl-salicylic acid has been used heretofore.

# For Children

## in Bronchitis, Whooping-Cough, Measles, and Scarlet Fever



Angier's Emulsion is one of the most useful and dependable remedies at the command of the physician for the treatment of the various inflammatory and bacterial affections of children. Its soothing inflammation - allaying properties and its general tonic effects are of first importance in these ailments, while its pleasant cream-like flavour and ready miscibility with milk make it easy of administration even to the youngest infants.



In many of the wasting diseases of childhood a sensitive, irritable stomach and intestines preclude proper nourishment. Under the administration of Angier's Emulsion these organs become pacified and retentive, digestion is strengthened, and the assimilation of food is normal and complete. We confidently urge its trial in marasmus, scrofulosis, inherited tuberculosis, anæmia, and in the malnutrition associated with acute infectious disease.

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# ELITYRAN<sup>®</sup>

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'ELITYRAN' is issued in tablets of 0.025 g (gr  $\frac{1}{20}$ ) in tubes of 30 and bottles of 250

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DUNCAN'S OPHTHALMIC CAPSULES contain medicaments *most* generally in use for Ophthalmic Treatment. They are specially shaped, and by merely snipping off the end of the long neck and exerting gentle pressure, the patient is enabled to apply the ointment direct to the eye in a safe and aseptic manner. Each capsule is packed in a small carton with directions for use and can be handed to the patient without further labelling.

They obviate the necessity of dispensing such ointments in open containers with its attendant risk of contamination from dust, etc.

1	Acid Boric	10%	16	Hydrag Ammon	1%
2	Argyrol	1%	8	Hyd Oxid Flv	
3	.	10%		Amorphous	2%
(P 1) 4	Atropin	1%	9	Hyd Oxid Flv	
(P 1) 5	.	2%		Amorphous	1%
(DDA) 6	Cocain	1%	(1 1) 10	Hyd Oxid Flv	
(DDA) 7	.	2%		Amorphous	2%
(DDA) 17	2% c Atropin	1%		c Atropin	0 5%

THESE OINTMENTS ARE MADE  
FROM THE FINEST, NEUTRAL,  
WHITE PARAFFIN JELLY AND  
MAY BE HAD IN ANY FORMULA  
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ONE of the most potent of modern antiseptics, physiologically pure and extremely soluble in water. ACRIFLAVINE (BOOTS) kills organisms in a concentration of 1 in 100,000. Its potency is actually increased in contact with serum. Now recognised as the routine preparation for irrigations in the treatment of Gonorrhœa. Ideal for suppurating wounds and all septic conditions.

Supplied in 5 gm and 20 gm bottles, and in Solution Tablets for external use (gr. 1.75 and gr. 2.187).

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Is specially prepared for internal use (per os) in the form of enteric-coated tablets.

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# ESTABLISHES REGULAR EVACUATION



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It is admitted that the large majority of patients suffer from the direct or indirect effects of constipation. It is often difficult to educate them to combat these evils. Some are ignorant, others apathetic, while many of them dread the griping pains and weakness occasioned by the ordinary laxatives. Sal Hepatica is pleasant to take and both prompt and painless in action. It maintains the biliary secretion in a healthy fluid state and ensures freedom from congestion and from that sub-acute inflammation of the gall bladder which is at present so common, especially amongst sedentary workers. Sal

Hepatica does not create a condition of tolerance. It is, therefore, the laxative of choice in chronic constipation.

Sal Hepatica contains sodium sulphate, sodium phosphate, sodium chloride and lithia citrate in an effervescent medium.

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# Hepatica

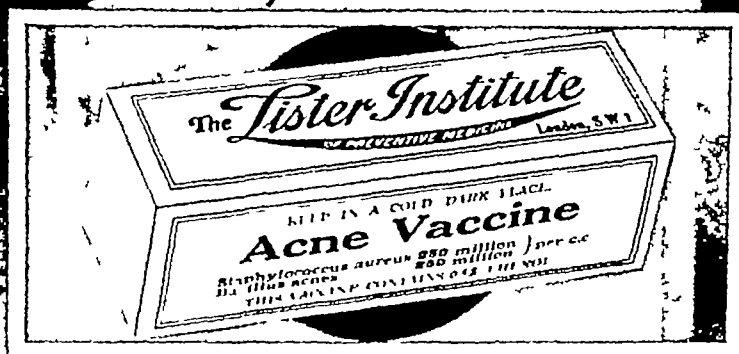
the proved, medicinal, saline laxative & cholagogue

# The Lister Institute

OF PREVENTIVE MEDICINE

Therapeutic Substances Act, 1925 Manufacturing Licence No 9

## Antitoxins, Vaccines and Serums



### Acne Vaccine

Consistent of *Staphylococcus Aureus* and *Bacillus Acne*  
1 cc. 5b also supplied in various strengths.

### Anti-Dysentery Serum (Multivalent)

Shops (500 units) Fleener's Sound)  
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(Glycerin Solution)  
In phials of 1 cc. equivalent to 10 cc. natural serum  
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In phials containing 10 and 25 cc.

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(Puerperal)  
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In phials containing 25, 50, 100 and 1,000 million organisms per cc.

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In phials containing 100 and 650 million organisms per cc.

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In phials of 1,000 10,000 100,000 1,000,000 and 2,000,000 units  
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(Aureus, Citreus, and Albus)  
In phials containing 500, 1,000 and 2,000 million organisms.

### Staphylococcus Vaccine (Aureus)

In phials containing 500, 1,000 and 2,000 million organisms.

A descriptive pamphlet issued under the Authority of the Governing Body of the Lister Institute will be sent on request

Sole Agents

## Allen & Hanburys Ltd., London

1, New Maple, Finsbury Road

Telephone: "Northern" Words Local 11



## Parke, Davis & Co.'s EYE OINTMENTS

**T**HE Parke, Davis & Co Eye Ointments are prepared from the purest ingredients, great care being exercised to ensure the absence of grittiness and foreign irritants. The collapsible tubes in which the ointments are supplied are convenient and cleanly. They preserve the contents from contamination and atmospheric action, and are provided with elongated nozzles which facilitate the application of a small quantity of ointment to the inner surface of the eyelid.

*The following formulae are available —*

**Adrenalin and Chlorotone.** Contains 1 per 4000 of Adrenalin Chloride and 5% of Chlorotone.

**Atropine** 1%. Half the strength of the B.P. ointment.

**Boric Acid** 10%.

**Calcium - Sodium Iodide.** Contains Calcium Chloride 2%, and Sodium Iodide 3%. Has been

stated to be of service for the treatment of cataract.

**Copper Sulphate** 0.5%.

**Eserine** 0.25%.

**Ethylmorphine Hydrochloride** 1% and **Yellow Oxide of Mercury** 1%.

**Ethylmorphine Hydrochloride** 3% and **Yellow Oxide of Mercury** 1%.

**Homatropine**, 1%.

**Ichthyol Compound.** Contains Ichthyol 2.5% ; **Zinc Oxide** 2.5%.

**Neo-Protosil** 5%. A colloidal silver iodide combination, mildly antiseptic, which does not irritate and does not cause dark stains.

**Protosil** 5%. Proteid silver compound.

**Scarlet Red**, 2.5%.

**Yellow Oxide of Mercury** 1% or 2%. Prepared from freshly precipitated mercuric oxide in impalpable, non-irritating condition.

**Yellow Oxide of Mercury** (1%) with **Atropine** (1%).

Further particulars of these ointments and of 'Oculets' (soluble discs for ophthalmic medication) will be sent on request.

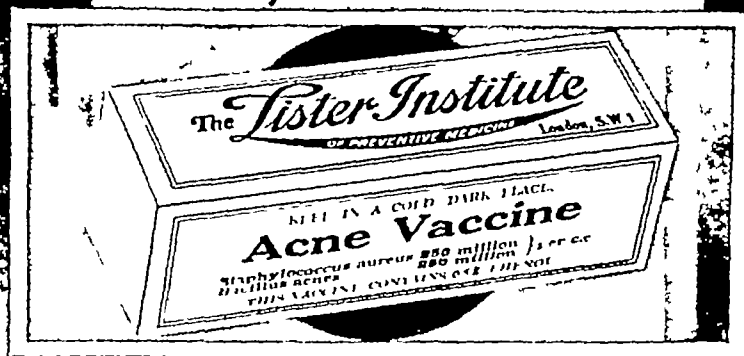
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LABORATORIES: HOUNSLOW, MIDDLESEX  
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# The Lister Institute

OF PREVENTIVE MEDICINE

Therapeutic Substances Act, 1925 Manufacturing Licence No 9

## Antitoxins, Vaccines and Serums



### Vaccine

Composed of Staphylococcus Aureus and  
Bacillus Aerogenes  
1 cc. vials supplied in various strengths.

#### Anti-Dysentery Serum (Multivalent)

Shops (1000 units) Flemer & Sonnet  
(Gibbs & Sons)

#### Anti Meningococcus Serum (Multivalent)

(Gibbs & Sons)  
In phials of 3 cc. equivalent to 10 cc. natural serum  
- 10 cc. - 15 cc. - 20 cc. - 25 cc. -

#### Anti Pneumococcus Serum

In phials containing 10 and 25 cc.

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*References* — Communications to the Societe de Dermatologie et de Syphiligraphie (July 1928)  
*Etude experimentale du Bismuth lipo-soluble*, par M C Levaditi en collaboration avec M V Sanchis-Bayarri et Mlle R. Schoen (pour la partie experimentale et histologique), Mlle Y Mannin (pour la partie chimico-analytique)

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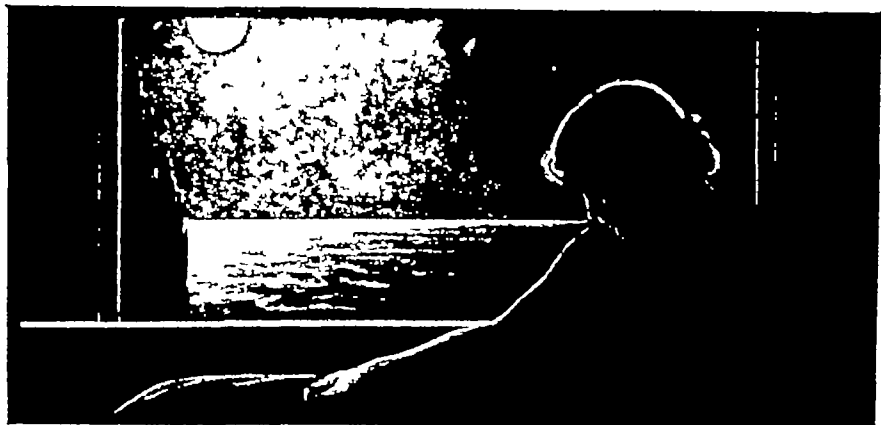
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# THE PRACTITIONER

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## The Relations between Eye Disease and General Medicine

By ERNEST CLARKE, CVO, MD, FRCS

*Consulting Surgeon to the Central London Ophthalmic Hospital,  
Honorary Fellow of Downing College, Cambridge.*

IN contemplating a long vista of fifty years of a busy professional life and comparing our medical knowledge at the beginning of this period with the present time, one is struck with the enormous progress that has taken place and especially in the department of etiology. It seems only a few years ago since William Hunter and William Lang showed that dental sepsis was a fruitful cause of eye trouble. This work has been perfected by MacCallan, who, by means of ideal X-ray photographs of the teeth, has shown that even one small apical abscess of a tooth is enough to act as a focal sepsis and may cause eye trouble, and when the tooth is removed the condition clears up. Focal sepsis is recognized as constantly causing eye disease. Not only the teeth, but the tonsils, accessory sinuses of the nose, the prostate, bladder, intestinal canal and female pelvic organs may be the focus of a sepsis, and the toxic products circulating in the blood may cause conjunctivitis, blepharitis, phlyctenular conjunctivitis, corneal ulcers, and iritis and cyclitis, also deep-seated trouble, such as choroiditis, retinitis, and papillitis. MacCallan says that some forms of cataract, glaucoma,



and detachment of the retina may be due to focal sepsis. Further, the toxins circulating in the blood may produce dilatation of the small retinal vessels, diapedesis takes place and we get the small petechial superficial hæmorrhages that McCrea has described, and when the septic cause is found and removed, the hæmorrhages disappear. Various cocci, streptococci of all kinds, staphylococci, and *B. coli* circulating in the blood may cause eye trouble.

Some years since, a lady, aged 55, was seen by me with what was once called "hæmorrhagic retinitis," the fundi of both eyes were covered with small superficial hæmorrhages. The pathologist found *B. coli* in the bladder, she was treated with autogenous vaccines and in a short time was completely cured—not a sign of hæmorrhage and not even a scar was left on either retina.

I have seen many cases of retinal hæmorrhage, sometimes with exudates and sometimes with commencing papillitis, where a septic tooth, tonsil or autrum was found, and when the focal sepsis was removed, the eye has cleared up completely. All this goes to show what a delicate index the eye may be of processes occurring in other parts of the body. We must now consider the various diseases and disorders of the body, the diagnosis and treatment of which can be enormously helped by a careful and thorough examination of the eye.

Diseases of the eye that are easily seen, such as conjunctivitis, corneal ulcers, keratitis, iritis, and cyclitis may afford valuable help in diagnosing a complaint, but we must also look out for the presence of deeper diseases, such as retinal hæmorrhage, retinitis, choroiditis, and papillitis, which in their early stage may be totally unsuspected, and when found do afford most valuable help. Inflammatory changes in other parts of the body do not necessarily have their counterpart in the eye, but when they do, this positive evidence is always of priceless value.

The living eye may be looked upon as Nature's laboratory, where changes can be seen and watched

The glomeruli of the kidney and the vascular plexus in the brain have their counterpart in the ciliary processes of the eye. Treacher Collins has shown that the epithelial cells covering the ciliary processes keep back injurious substances, but when toxins circulate in the blood these cells become detached and their protecting power is lost. This process takes place also in the kidney. The catarrhal nephritis of pregnancy may be associated with acute retinitis with hæmorrhages and exudates all over the fundus—the disorder of the kidney does not cause the retinitis, but they are both caused by the presence of the same toxin circulating in the blood. The kidney cannot be seen, but the retina can—hence the value of the ophthalmoscope.

The advent of the luminous ophthalmoscope has put this valuable instrument into the hands of every practitioner, for it requires no training to be able to use it. It is true that he may be unable always to recognize an abnormality, but he will certainly be able to see a hæmorrhage, and the value of this early diagnosis is enormous. The macula may have escaped, and so vision is quite good, the patient has no idea that his eyes are at fault and so an oculist has not been consulted. When the practitioner sees this hæmorrhage he knows at once it is a danger signal, and so probably gets hold of a disease at an early stage when a cure may be effected, whereas later on it might be difficult or even impossible to do any good. Let me give a good example.—

Some years ago a boy of 16 was brought to me by a practitioner who had examined the boy's eyes with the ophthalmoscope and thought he saw something abnormal in the left eye—the boy did not complain of his sight. I found on the nasal side of the disc (and therefore away from the macula) a largish solitary tuberculous mass. He was treated with tuberculin and in the course of a few months the mass disappeared, only leaving a large white scar.

Now this boy had no symptoms of phthisis or other tuberculous trouble, but he probably had small isolated patches of tubercle in other parts of the body, which could not be seen or diagnosed and

which were too small to produce symptoms. Certainly the blood must have been tainted with tubercle, because it is rare for the eye to be attacked alone. Now the treatment that cured the tubercle of the eye also cured any other tubercle that might have been present. Since then, now many years ago, he has had no sign of any tuberculosis and is a healthy man. Can it be doubted that if this tubercle had not been seen in the eye, that the disease would probably have progressed, say, in the lung, and might have become incurable?

The examination by the ophthalmoscope may reveal the beginning of arteriosclerosis, perhaps before there is any sign of hardening of the main arteries of the body and before there is any suspicion of increased blood-pressure. This is a useful warning and it is important to have the chance of possibly arresting an affection that, if neglected, might prove fatal in a few years.

The value of the ophthalmoscope in diagnosing brain tumours is generally acknowledged, and although the evidence may be negative and nothing abnormal be seen in either fundus, yet when positive, and a "choked disc" is discovered, the information may be invaluable. The disease may be quite unsuspected, as it may exist without any deterioration of vision. As a proof of this latter statement the following case, seen by me some years ago, is a good example.—

A man, aged 40, was sent to me for a refraction examination—he did not complain of his sight except that he thought he needed glasses for reading. On examination I found a marked "choked disc" in both eyes. A few days later at the operation an enormous sarcoma occupying the whole upper surface of the brain was found. It was impossible to remove this and fortunately for the patient he died on the operating-table. Suppose this had been a small tumour, which could have been enucleated and which, as in the case just cited, was unsuspected because of the absence of symptoms, think how valuable the ophthalmoscopic examination becomes!

Cases are constantly being recorded of the discovery of papillitis leading the practitioner to a thorough examination that enables him to diagnose and localize a brain tumour, which is eventually removed and is followed by the patient's complete recovery, which result would probably not have occurred without the

ophthalmoscopic examination

One of the most subtle and perhaps the commonest association for harm between the eye and the body is revealed in eyestrain. Every one knows that headaches may be caused by eyestrain, but even now it is not generally recognized how many complaints may owe their origin to it. Ocular migraine, dyspepsia, insomnia, general lassitude or malaise, loss of the *besoin de vivre*, may be entirely due to eyestrain—or eyestrain may be the chief cause. The reason this is so subtle is that more often than not the eyes are not suspected. Vision is good and the patient is quite unaware that this good vision is obtained at a big expense of nervous energy. Small errors of astigmatism and anisometropia can be unconsciously corrected, and this means a constant drain on the nervous energy, impulses are passing from the brain to the ciliary muscle during all the waking hours. In the robust and the young this may not have any apparent harmful effect, but in those who are weakly or who have a delicate nerve organization or whose “nerve balance” is easily upset, this constant drain may produce all sorts of symptoms, some of which have already been enumerated. It must be remembered also that in addition, this eyestrain produces reflex irritation and loss of resisting power, both locally and generally, and lowered vitality.

Large errors of refraction cannot be corrected in this way, and so they “take care of themselves”; as a rule vision is below normal and the patient is aware of it and so gets a suitable correction; but, as always in doing refractive work, the errors must be properly and fully corrected. A glass that is almost right is worse than no glass, because it leaves the eye work to do which, of course, causes eyestrain. In correcting small errors the most meticulous care must be adopted, both in choosing the cylinder and its axis, and every one under forty years of age should have the eyes examined under a cycloplegic. Common sense teaches us that

in which an inflammation of the iris dominates the clinical picture, justifies the use of the term *iritis*

Accepting the word in this somewhat non-scientific sense, we may take *iritis* in its acute form as being characterized by an inflammatory disturbance essentially located in the stroma of this tissue. There is an intense vascular dilatation with a profuse oedema of a highly albuminous tissue-fluid associated with a leuco- or lympho-cytosis into the surrounding tissues. Frequently there are one or more focal lesions where the oedema and distortion of the iris tissue is accentuated, which lead to necrosis. The hyperæmia extends throughout the anterior ciliary circulation producing a deeply injected red eye; the engorgement and water-logging of the stroma obliterate the delicate architecture of the iris giving it a blurred "muddy" appearance, turgescing its spongy tissue. This impairs or abolishes the mobility of the iris, while the dilated vessels and the oedema make the pupil constrict, an effect augmented by the irritation of the nerves to the sphincter by the deleterious substances in the inflammatory exudate. Exuding to the surfaces of the iris, this sticky fibrinous exudate may be visible upon the anterior surface, or accumulating upon the posterior surface, makes the iris adhere to the lens; while, pouring out into the anterior chamber, the aqueous humour becomes turbid, and may deposit its colloid and cellular constituents upon the posterior surface of the cornea where they adhere to the oedematous endothelium as keratic precipitates. In certain very severe cases the excessive outpouring of exudate leads to the formation of an hypopyon in the lower part of the anterior chamber, or even the accumulation there of red blood cells to form a hyphæma.

Meantime the irritation of the intra-ocular nerves excites a neuralgic pain which may be of considerable violence, and, radiating over the distribution

of the first division of the trigeminal nerve, may be referred not only to the eye and the regions supplied by the supra-orbital and supra-trochlear branches, but also to the malar region and cheek, and sometimes to the nose and teeth. The pain is accompanied by an intolerance to light, profuse lachrimation, and a general feeling of *malaise*, while the vision is usually seriously impaired.

Thus an acute attack. It runs a fulminating course and subsides with treatment with more or less damage to the eye. The subacute types, although appearing immediately less serious, are frequently more dangerous in the long run. Multiple minute lesions appear in the iris, each of itself of little moment and causing little disturbance and accompanied by little injection and mild symptoms, but each causing a tiny area of necrosis and a slight outpouring of exudate which determines a slight adhesion to the lens. This may recur with persistent regularity until finally the sum of the damage becomes a matter of great seriousness. The pupil is blocked up with exudate and vision becomes seriously impaired; the entire pupillary margin is bound down to the lens so that the intra-ocular circulation is impeded and a raised tension develops, or the delicate trabecular drainage channels at the angle of the anterior chamber become choked up by organizing fibrinous and cellular exudate, and glaucoma supervenes. In so far as the inflammation extends back to the ciliary body the injection of the anterior part of the globe becomes less, but the impairment of the permeability of the vessel walls of the glomerular-like tufts of the ciliary processes leads to a heavy outpouring of inflammatory products, the keratic precipitates are larger and more profuse, the vitreous body becomes turbid and filled with opacities, and a plastic membranous exudate covers the lens, while the upset of the metabolism of the whole eye leads to a liquefaction of the vitreous, the development of

cataract, or even to a slow shrinkage of the globe.

The greatest interest and most important aspect of these cases are their etiology, for upon this hinges their prevention, their rational treatment, and the undertaking of precautions against recurrences which too frequently bring disasters in their train. Unfortunately the etiology of iritis is a question about which much is obscure. At the commencement two types may be differentiated: (1) those relatively rare and obvious cases wherein an infection is introduced into the eye by a perforating wound or ulcer, and (2) the great majority of cases wherein the causative agent enters through the blood-stream. In the latter group of cases, which alone interests us in the present connection, the inflammation may be set up either by the entrance of micro-organisms or of toxic materials into the eye. In a small minority of cases where actual tuberculosis or gummatous nodules are present, the type and method of infection is obvious; but the average case of iritis presents a nondescript, non-specific clinical picture, and can only be assessed as a member of a very heterogeneous group in which scientific classification is as yet quite impossible.

It is undoubted and generally admitted that cases of this character are associated with tubercle, syphilis and gonorrhœa, and it is as certain that other cases are associated with an infective lesion (streptococcal, staphylococcal or others) in some other part of the body, but the uncertainty which is attached to the average case and the difficulties that lie in the way of making a diagnosis are so great that any conclusion based on sound statistical material is quite impossible. Indeed, opinions on this question vary so much between individual clinicians, between different schools, and between different countries, that a study of the literature leads nowhere. In Central Europe, for example, a vast number of cases of nondescript chronic and recurrent iritis are unhesitatingly labelled tuberculous

thus Löwenstein in a recent book declares that it is widely accepted that 50 per cent. of cases of uveitis are produced by tuberculosis. In this country, on the other hand, few ophthalmologists—if any—would admit such a thesis, and there is a tendency for the etiology to be sought in an infective focus in some remote part of the body. In America the general opinion seems to fluctuate between the two extremes. It is certainly true that diseases vary with their geographical and racial incidence, and that tuberculosis may be much more rife in Central Europe than it is here; but the fact remains that medical opinion is in the unsatisfactory state with regard to this question that the same clinical picture would be labelled tuberculosis in Germany or Vienna, and the result of a focal infection in this country, while, subjected to American enthusiasm, the same patient would be treated by having his teeth extracted and his tonsils removed and at the same time be subjected to a course of tuberculin.

There is no doubt that an iritis can be produced by the actual lodgment in the eye of micro-organisms. This has been abundantly proved experimentally since the classical experiments of Cohnheim in 1867, who inoculated guinea-pigs with tuberculous material and found on autopsy tubercles in the uveal tract, and the work of Haensell (1879), Friedrich and Nosske (1899), Lagrange (1895–1898), Stock (1903), Axenfeld (1905), Rollet and Aureau (1908), and others, who produced uveal tuberculosis by injecting tubercle bacilli into the blood-stream. At the same time it would seem hardly probable that this mechanism represents the usual method of infection. It would be necessary in this event to postulate that organisms actually entered the blood-stream from the teeth, tonsils, intestines and so on, and entered the eye, setting up inflammatory changes there. Apart from the fact that the experimental introduction of a



suspension of organisms into the eye usually leads to an acute inflammation which develops into a panophthalmitis—a picture quite different from the usual case of recurrent iritis—it is difficult to imagine how the organisms could reach the eye. If they do so by the blood-stream, they must first traverse the capillary sieve presented by the lungs, and their presence in the eye would be expected to coincide with bacterial emboli in many other parts of the body but pneumonia does not occur with iritis, nor does it commonly form part of a general pyæmia. It would thus appear necessary to assume that either bacteria or their toxins may have a very highly developed specificity for the uveal tissues, or alternatively that these tissues can acquire a super-sensitivity far in excess of those possessed by most regions of the body.

That infective foci in remote parts of the body do figure in the etiology of iritis rests upon a very weighty mass of evidence. The first to draw attention forcibly to the matter was William Lang in a paper on “The influence of Chronic Sepsis upon Eye Diseases” read in 1913 before the Royal Society of Medicine. The evidence presented at that time has been corroborated by clinical findings on innumerable occasions of patients suffering from iritis, in whom an infective focus was established and in whom the ocular symptoms cleared upon removal of that focus. Direct experimental proof that this is indeed the case has been recently supplied, particularly by workers in America. In 1916, Irons, Brown and Nadler produced an iritis in rabbits by the intravenous injection of streptococci isolated from a patient suffering from this disease. This result was corroborated by Meisser and Gardner in 1928, who produced a similar experimental iritis with a streptococcus isolated from an infective tooth in a patient suffering from acute iritis. Similarly Haden, in 1923, produced an iritis in 68 per cent of rabbits inoculated with cultures from the teeth of patients

who had iritis, and only in 14.8 per cent of rabbits inoculated with cultures from patients who had infected teeth but no uveal complications.

Rosenow (1915-27), and Rosenow and Nickel, working in the Mayo Clinic (1929-32), have carried out very extensive researches on the subject to determine by means of experiments on elective localization the relative importance of focal infections in the tonsils, teeth, prostate, and uterine cervix in persons who had diseases of the eye, arthritis, myocarditis, and other infections. Their results were very striking in 215 rabbits which received injections of 74 cultures of streptococci derived from 69 patients who had intra-ocular lesions, an iritis developed in 18 per cent. Cultures derived from patients who had other lesions behaved similarly, but instead of causing reactions predominantly in the eyes, the streptococci tended to localize in the regions corresponding to the tissues affected in the patients from whom they were taken. There appears, therefore, to be some grounds for the belief that a very definite degree of tissue-selectivity does exist.

There is also a considerable amount of evidence that sensitization of the uveal tissues may play a part in the occurrence, and especially in the recurrence, of inflammation of the uveal tissues. A number of investigators have immunized animals by subcutaneous, intravenous, or intra-peritoneal injections of a foreign protein, and obtained a marked iritis on subsequent intra-ocular injection of the same material. In this connection the work of Nicolle and Abt (1908), Krusius (1910), Wibaut (1919), and Seegal (1930) is interesting, but probably that of Brown (1932) is most suggestive, who has brought forward evidence that organisms may give rise to the same sensitivity. He injected into the anterior chamber of rabbits a suspension of a strain of a hæmolytic streptococcus, and after the reaction had died down, found, on intravenous

injection of the same organism, that a violent recurrence of iritis became evident. A more interesting series of experiments showed that the same result followed the injection of the toxin of a strain of streptococcus. In each case control eyes injected initially with distilled water showed no subsequent reaction.

It would appear, therefore, that the possibility has been established that not only an organism but a toxin can produce sensitization in the tissues of the uveal tract, and that recurrences of inflammation can be excited by a liberation of quantities of that toxin into the blood-stream. In this event the stage is occupied not so much by the bacteria as by the local allergic state to which their presence has given rise. The problem thus shows some affinities to the sensitivity of the mucous membranes in hay fever, recurrent attacks of urticaria, or the phenomena of serum sickness, and perhaps may be analogous to the evanescent swellings and shifting joint pains in acute rheumatic fever.

In the great majority of cases, therefore, the discovery of the etiology of a typical case of iritis is a problem beset with difficulties, and about which a conclusion can rarely be reached with certainty. Each case should involve an exhaustive examination of the individual patient. Tuberculosis may be diagnosed tentatively on the chronicity and recalcitrant nature of the disease, on the large "mutton-fat" keratic precipitates, on the family and personal history of the patient, on the presence elsewhere of medical or surgical tubercle, and—valuable largely as negative rather than positive evidence—on positive serum reactions such as the von Pirquet or Mantoux test. Gonorrhœa is usually suggested by the violence and recalcitrant course of the recurrences, with the occasional appearance of a hypopyon or a hyphæma; syphilis should be eliminated by the clinical history and general symptoms as well as by the Wassermann

reaction; and if none of these opens up a hopeful avenue for treatment, a search for focal sepsis should be made. This should include the teeth, the tonsils, the nasal sinuses, the alimentary canal, the prostate, the cervix uteri, the urinary tract, and so on, and in the assessment of these it is to be remembered that more than one may exist simultaneously. Thus it is possible for a streptococcal infection to involve the teeth, the tonsils, and the colon, or for two different types of infection to be firmly established in two different regions.

The removal of a particular focus, therefore although it is frequently followed by a spectacular cure, cannot be relied upon to remove the source of infection from each individual case. Some information may be obtained from the reaction of the blood to the various strains of organisms isolated, and it may be in the future that some help may accrue from eliciting a specificity to uveal tissue by injecting the various organisms into experimental rabbits in the hope that the particular one involved will excite an iritis. In the present state of our knowledge the most that can be done is to eliminate in so far as is practicable the most obvious source and to increase the resistance of the patient as much as possible by the judicious employment of autogenous vaccines. There remains a large and indefinite group of cases which may be due to defective elimination—renal inadequacy and constipation—with a consequent concentration of toxic products in the blood. The treatment of the cause in this way—in addition to the classical local treatment of rest, atropine, and heat—is the most essential element in the management of those cases; nor should the definitely allergic element present in so many cases be forgotten, a factor which explains the almost spectacular value of an injection of foreign protein, such as milk, in certain cases, and may to some extent account for the benefit derived from

the therapeutic use of tuberculin in others when it is employed as a last resort in the absence of any other definite indications for treatment.

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# Cataract

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*Late L.M.S.*

THERE is probably no subject in the whole range of surgery in which the differences, both as to theory and practice, are so widely divergent as in the treatment of cataract. In August, 1903, I dealt with this topic in *THE PRACTITIONER*,<sup>1</sup> summarizing my first-hand experience of the practice of a number of leading surgeons in eleven Continental countries. Except in matters of antisepsis and asepsis, the opinions probably differ as widely to-day as ever.

*Diagnosis*—A cataract can easily be studied by examining the eye from a distance of a few inches with an electric ophthalmoscope using a high plus sphere, (12.0 to 20.0 D.). In early cases the lower part of the lens is often first affected, and the opacities can be seen by making the patient look down. Artificial mydriasis is unnecessary and should be avoided. *Muscae volitantes* often alarm a patient and give rise to an incorrect diagnosis of cataract. The fact that the patient sees them moving independently of eye movements show that they are in the vitreous and not in the lens, and should discourage him from paying any attention to them.

*The most favourable time for operation* is decided by consideration of every factor in each case. As soon as an eye is blind to the point of uselessness, the cataract should be removed. (1) To save the patient from the danger of injury owing to his defect on that side; (2) to avoid the dangers of hypermaturity, the principal of which are secondary glaucoma and iritis; and (3) to secure the highest possible *morale*. If it can be avoided, the cataract patient must not feel that everything depends on the success or failure of the operation. The fact that he has a second eye in

leading to complete blindness, and suggest that the operation on the other eye, if the blinder, should not be delayed.

The history of the duration of a cataract is often very unreliable, especially when bilateral. The patient not infrequently fails to notice the loss of the first eye, and dates his history from the progress of cataract in the second one.

*Precautions.*—The cataract operator must take no avoidable risks. The rules are: Get the patient into the best possible state of health. Exclude every source of auto-intoxication. Have the nose, throat, nasal sinuses and ears examined and treated if necessary. Incomparably the greatest danger lies in dental sepsis, and a radiogram should be taken whenever there is the least doubt; err on the side of doing too much rather than too little; you can get 32 fresh teeth, but no new eye. Examine and, if necessary, treat the lachrymal passages. In doubtful cases insert a temporary suture encircling each canaliculus just before operation; remove these when healing has taken place. Carefully treat any septic foci on lids or adjacent skin. Instil silver collosol into both eyes for from one to four weeks before operation, according to the case. Use perchloride of mercury ointment (1 in 3,000) night and morning for the last week or ten days. Before the actual extraction, if the patient will submit to it, instead of the ointment I have a solution of silver nitrate, gr.  $\frac{1}{12}$  to the  $\frac{1}{31}$ , instilled once daily for seven days before the operation. This treatment is painful, but it confers a great measure of safety and never does harm, though many patients are alarmed by it. I place little reliance on bacteriological examination of the conjunctival sac.

*General diseases.*—Provided the patient is in a good state of general health and is not losing weight, the presence of glycosuria does not contra-indicate an extraction, so long as diacetic acid and acetone are

absent.<sup>4</sup> The wound heals well and convalescence does not appear to be interfered with. Nor is leprosy a bar to successful operation.<sup>5</sup> Cardiac and other enfeebling diseases do not prevent success, but, like every other factor, they must be taken into account in each individual case. Here, the help of the general practitioner is of the greatest value. Pathological tremor adds little to the difficulties of a skilful surgeon, though it embarrasses beginners. In weighing the difficulties and dangers of general disease one must carefully take into account on the other side the hopelessness into which absolute blindness plunges most elderly people. Insanity is a difficult and dangerous factor, but with the help of the medical attendant and with due precautions, these patients rarely give trouble. Causes of coughing must be treated beforehand and removed as far as possible. Spring and summer are the favourable seasons for cataract operations, for then bronchitis is less frequent and the vitality of the old is usually at its highest.

*Etiology.*—Heredity plays a prominent part, and the cataract often follows a similar course in successive generations. Cataract is probably a dystrophy of the lens closely associated with and comparable to other senile changes. Hence, the administration of thyroid is one of the few measures which appear favourably to affect the progress of a cataract. Depression of health is an important factor, both in starting cataract and in influencing its progress unfavourably. Severe bodily injuries, anxiety, sorrow, sudden shocks, influenza and other debilitating diseases are all fraught with danger. The operation on the first eye is often attended by a comparatively rapid increase in the second cataract. Glare is probably a factor in the tropics.

*Treatment.* — Unqualified practitioners advertise treatment by coloured lights, by strong plus spheres, and by various other forms of auto-suggestion. Patients



often think they can see better after such treatment, but a methodical examination of the cataract and of the vision does not reveal any improvement. Moreover, many cataract patients see better on some days than others; this is largely a question of light and of general health, the delusion of improvement is born of hope and despair, and is fostered by these variations. A patient with nuclear cataract sees better on a dull day or with his back to the light or when he shades his eyes, owing to greater dilatation of the pupil. The provision of a vulcanite shade to take the place of the hands is often helpful.<sup>6</sup> Again, some patients in an early stage of diffuse cataract see better on a bright day, the increase of light helping to penetrate the uniform, but still moderately dense, cataract. Imagination also plays no small part with those who are liable to auto-suggestion. The surgeon who fails to explain the true position to a patient with a slow-growing cataract is playing into the hands of the quack. The indiscriminate use of the term "cataract" is to be deprecated when dealing with a condition which may never necessitate operation. It is correct only when qualified by terms such as "partial" and "slowly progressive." The progressive type of opacity may be termed "cataract," the other forms being spoken of as "flaws in the lens."

Many favour treatment by injections of mercury and other salts, or by the instillation or injection of iodides. Their value is doubtful, and the matting of the peri-limbral tissues following injections may add to the difficulties of any subsequent operation.

The common practice of inducing mydriasis to improve the vision of elderly patients with central cataract is very dangerous, whatever the drug used. The alternative is iridectomy, which safely improves vision through its coloboma, sometimes for years, and even for life, and which in any case is a preliminary stage to an extraction when the time comes.

*Progressive cataracts* should be seen at intervals so as to choose the best possible time for operation. *Swelling cataracts* presenting mother-of-pearl sectors and shallowing of the anterior chamber, are a menace to the safety of the eye, especially from the point of view of secondary glaucoma, and should be extracted early. *Congenital cataracts* associated with good vision may be left alone unless they are progressive. There are many other varieties with which it is impossible here to deal. The outstanding point is that every cataract must be dealt with individually, every factor of each case being taken into account.

*The preparation for operation* closely interests the practitioner:—(1) Instil atropine solution (1 per cent) one hour before extraction or needling, and eserine (1 per cent) before iridectomy. (2) At three-minute intervals make four instillations of 4 per cent. cocaine solution, and two of adrenaline solution, 1 in 1,000. (3) Inject trivaline hyoscine,  $\frac{1}{4}$  to  $\frac{1}{2}$  c cm. subcutaneously. This helps the first day to pass in comparative comfort. (4) Paralyse the facial nerve by O'Brien's method.<sup>7</sup> (5) Inject 2 minims of 2 per cent. novocain under the conjunctiva below the cornea. (6) Balloon the upper fornix by injecting  $\frac{3}{4}$  c cm. of 2 per cent novocain, inserting the needle at the upper edge of the tarsus on the temporal side. (7) Trim the lashes with scissors, vaselined to prevent hairs falling on the eye. (No. 3 is not required before iridectomies or needlings.)

Express the Meibomian glands digitally by pressing the two lids against each other and rub the lid edges with a small mounted iodine swab. Cleanse the conjunctiva with special mounted swabs<sup>8</sup> under normal saline irrigation.

There are two main methods of extraction: the intracapsular and the capsule-laceration operation. Many operators favour Barraquer's intracapsular method for immature cataracts. I prefer the capsule-laceration operation for all cases. It is applicable to

mature and immature cataracts, provided the following technique is adopted<sup>6a</sup>:—(1) A narrow, complete, upward, preliminary iridectomy (2) A month later, extraction by the following steps: (a) excision of a central piece of the capsule with a Bowman's needle; (b) a sclero-corneal section finished off in a large conjunctival bridge above; (c) delivery of the lens; (d) free irrigation of the chamber with normal saline solution<sup>9, 10</sup> to wash out cortical matter and to replace the iris and capsule edges, (e) instillation of atropine. Some surgeons prefer to do the whole operation in one sitting instead of doing a preliminary iridectomy.

Some comments are needed:—(1) The needle provides valuable information as to the nature and size of the lens to be dealt with, and has important bearing on the later stages of the operation. (2) Bridge extraction is more difficult than that with an open wound, but it is a safeguard in the event of vitreous escape and it ensures immediate healing of the wound (3) The section must be sufficiently large to permit easy delivery. Too small a section involves a serious danger of vitreous escape. (4) The suggestion that irrigation involves a danger of sepsis is refuted by the fact that before the writer left India he had a run of 1,000 consecutive irrigated cases without a single suppuration. (5) It is often urged that cortical masses left in the chamber set up iritis. Provided that the wound is kept aseptic, this is not the case. (6) Every instrument introduced into the eye must be absolutely sterile, and if a fresh introduction of any instrument is made, resterilization must first be effected.

*Soft cataract* in the young can be dealt with in one operation by needling freely through the intact limbus, making a linear section and washing out the lens with an irrigator. This greatly shortens the treatment of the case.

Any *after cataract* should be divided with a Ziegler's knife six weeks after the extraction, across the line of

its fibres as ascertained by the corneal microscope.

*After-management of the case.*—Operate on the bed, and keep the patient as quiet as possible for four or five hours. Severe pain is uncommon and can be relieved by aspirin. Releasing the bandage and allowing the patient gently to open the eye immediately stops the sometimes severe pain that may attend the imprisonment of tears. If the Madras bandage<sup>4</sup> is used this can be done with a minimum of disturbance. I have tried many protective devices, including different methods of tying the hands, and have given them all up in favour of a metal gauze shield of suitable shape covering the eyes and forehead.

If the section is soundly healed, release the unoperated eye after 24, or at the most 48, hours, and the operated eye two days later, though in this there is great latitude for individual treatment. Very old patients should be partly propped up in bed 6 hours after operation and at least one eye released after the first 24 hours. Allow no visitors for the first 24 hours; after that, encourage them, provided the patient wants them. Every patient should have a wireless set. The pupil should be kept well dilated, care being taken to compress the canaliculi and so prevent the escape of atropine down the throat. Local atropine irritation may be met by using hyoscine or homatropine, and by smearing the surroundings of the eye with zinc ointment beforehand. I have tried the careful injection of atropine under the conjunctiva. Atropism in one form or another is one of the greatest bugbears of the cataract operator.

*Iritis or irido-cyclitis* following operation is of two kinds.—(1) due to infection at the time of operation, or more frequently, from the conjunctiva subsequently; and (2) due to some unremoved focus of auto-intoxication. The first comes on within 48 hours and should rarely occur, the second begins from the

fifth to the tenth day and is far less severe in its course, but may lead to blocking of the pupil. Treatment. The instillation of atropine; the application of three or four large leeches, just above the eyebrow and over the temple, followed by hot fomentations; free purgation; the use of vaccines or sera; at a later stage, blistering of the temple, the blister being kept open by the use of savin ointment. The relief afforded by leeches and blisters is astonishing, and it is regrettable that these valuable therapeutic means are so little employed nowadays.

*Post-operative glaucoma*, especially after needling, must be kept in the forefront of the practitioner's mind. When in doubt he should seek help without delay. *Conjunctivitis* after operation is not infrequent and can be dealt with by the use of silver collosol, zinc and other preparations. A careful warning should be given against kissing by visitors. I have twice seen a serious injury to an operated eye from ladies' hat-brims. The patient should not go to the bath unassisted until he is quite strong again, and when he first gets out of bed he should be carefully watched lest he should fall and damage himself.

*Blood in the anterior chamber* almost always indicates an injury from rubbing or some such cause, often quite unknown to the patient. He should be carefully warned to avoid repetition of the injury. *Spasmodic entropion* of the lower lid may cause much pain. It usually stops at once when the eye is released from bandages. If not, a racquet-shaped piece of plaster attached to the lid and with a long handle over the cheek will often restrain the trouble. Failing this, gather up the skin of the lower lid in two sutures, one at each end, leaving them in for a few days.

*Restraint and invalidism after operation*—In the three weeks or longer after leaving the nursing home, between a preliminary iridectomy and an extraction,

a patient can usually carry on his ordinary work, always provided that it does not cause pain in either eye, but after extraction it is most inadvisable for him to attempt to do this for at least a month, and even then, he must carefully feel his way. When, however, it is a case of using his brain and not his eye, he may direct his business as soon as he leaves the nursing home, or even earlier, provided it can be done by reports read to him and instructions taken down by a stenographer. It is most important after operation to protect the eye from chills, especially from those due to wind. For some time afterwards the patient should use goggles when in the open air, unless the day is windless and warm. In the house he can wear a shade, or his ordinary glasses, or his goggles, or nothing, whichever he finds most comfortable.

The astigmometer is of great value in the examination for cataract glasses. It gives the axis very correctly, but often exaggerates the amount of astigmatism present. It is difficult to explain this, another astigmatic element has been introduced; is this an alteration in the curvature of the anterior surface of the vitreous body? As the scar contracts, the early extreme astigmatism against the rule diminishes markedly, so delay your test for at least three months and be prepared to revise the correction six months or more later. If the second eye sees well, put off the final refraction as late as possible and let the patient use the unoperated eye until it fails. The myope scores by needing lower plus spheres. The great majority of operated eyes see 6/5 or better and read diamond print with a suitable correction. Rarely, an eye after extraction sees equally well for distance and for near work with the same glass instead of needing a difference of plus 4 sphere.

*Red and blue vision*<sup>4b</sup>.—Erythropsia has long been recognized in this country. Cyanopsia has been said to be rare. In Madras, it occurs in over 50 per cent of

the extractions; my experience in England is that it is very common here

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# Certain Problems of Refraction in Relation to General Practice

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THE field covered by "errors of refraction" is wide and includes varied and multiple problems not without significance in general practice. It is by no means easy to select from this wealth of material two or three subjects or aspects of a subject that pertain more than others to the needs of the general practitioner. No selection would command universal assent; in other words, the final result is bound to be coloured by personal bias, a fact not entirely without values of its own. Without attempting to justify my selection I propose, therefore, to offer some remarks: (1) on headache, (2) on the care of myopia, (3) on the stages which characterize the treatment of squint, and (4) on a new departure in the correction of ametropia—namely, the prescribing of contact glasses.

## HEADACHE AND ERRORS OF REFRACTION

Ophthalmologists of a past generation found it a slow and difficult matter to convince the profession and the public of the close connection between the two. In the end they succeeded almost too well. Headache is a symptom the mechanism of which is imperfectly understood and the part played by one or other etiological factor is not always clear. Some writers place the proportion of cases of functional headache wholly or in part due to eye-strain as high as 30 to 60 per cent. Most ophthalmologists, however, would probably estimate the percentage much lower, perhaps



as low as 10 per cent. It should not be forgotten that in many patients the error of refraction may be only one of a multitude of causes capable of precipitating an attack and further that every type of refractive error is not necessarily a potential cause of headache. One of the exceptions is myopia—on the whole the most serious of the errors of refraction. Like anyone else the myope may suffer from certain forms of headache, such as migraine, which are often associated with and aggravated by a refractive factor. The high myope also not infrequently complains of undefined ocular and orbital pain or discomfort which he describes as headache. Again, headache on occasion is a symptom of uncorrected myopic astigmatism when the error is of low degree and oblique axis. The last condition may be regarded as the only exception to the rule that the myope does not experience the specific reflex headache of ciliary overstrain.

Hypermetropes, on the other hand, seldom escape. Children especially suffer a very great deal from uncorrected hypermetropia. Owing to the fact that their distant vision is relatively good and that their difficulty with near vision is masked by the high accommodative powers of youth, their hypermetropia may escape detection for years. Hypermetropia may initiate strabismus at the age of 2 but seldom causes headache before the age of 5. After this the incidence increases, although a proportion of cases remains immune. A rough generalization would be that headache is a symptom only of the lower degrees; that the higher degrees often escape; while the intermediate degrees frequently develop strabismus and by sacrificing binocular vision avoid the penalty of headache.

Astigmatism and headache are closely related, but the correlation is not complete or ocular headache would be a universal phenomenon. Usually only low degrees are responsible; the higher degrees escape entirely. Even astigmatism of low degree, i.e. under

$1\frac{1}{2}$  dioptries, when "with the rule," that is, when the correcting axis of myopic astigmatism is horizontal or of hypermetropic vertical, is not always associated with headache. If, however, astigmatism is "against the rule," and especially if oblique in direction, headache is generally a prominent symptom. If, in addition, its obliquity is also asymmetrical, that is, down and out on one side and down and in on the other, constant headache is almost inevitable. The higher degrees of astigmatic defect do not stimulate ciliary contraction and do not, therefore, cause headache.

Headache is sometimes, though not invariably, a symptom of insufficiency of accommodation, such as normal or premature presbyopia, temporary ciliary weakness following illness, or a result of focal sepsis. Unequal accommodation, on account of lenticular loss of elasticity having developed more rapidly on one side than on the other, also sometimes gives rise to this symptom.

Of anomalies of muscle balance or heterophoria it may be said that two varieties stand out as particularly associated with headache. These are hyperphoria or vertical imbalance and exophoria or insufficiency of convergence. Latent convergence (esophoria) seldom causes symptoms when manifest only for distance. If also present for near work, it will usually suffice to correct part of this amount by neutralizing prisms for constant wear. Hyperphoria may cause giddiness as well as headache and the giddiness is characteristic—it ceases immediately when one eye is closed. Relief may be obtained by prescribing prisms or decentering lenses equivalent to one-half or two-thirds of the total deviation. A certain amount of exophoria is normal, and it is only when the amount is so great as to interfere with continued convergence that it is necessary to combine prisms with the reading correction.

To sum up, apart from the anomalies of accommodation and defects of muscle balance just described, only

the following errors of refraction excite reflex headache—namely, the lower ranges of hypermetropia and low degrees of simple astigmatism, especially hypermetropic astigmatism “against the rule” or with oblique and asymmetric axes, and these only when binocular vision is present

#### THE CARE OF THE MYOPE

In two important respects myopia differs from other errors of refraction; first, it is progressive; secondly, it predisposes, in the higher degrees at any rate, to certain grave complications. There is a popular belief which is sometimes met with in non-ophthalmological medical literature, that short-sightedness improves as one gets older. The basis of this belief apparently is the fact that the onset of presbyopia is delayed in the myope; a myope of 2–3 dioptres may never require reading glasses at all. The myopic eye, however, never improves. On the contrary, with increasing years it becomes more prone to develop certain degenerative changes which may seriously impair its functions. During the years of growth and education, particularly at puberty and in the years of early adolescence, myopia tends progressively to increase. Already too long axially for its refractive system the myopic eye during the years of active growth shares in the general growth of the body, becoming still longer. Often, too, the myopic child is naturally studious in temperament—a long eye associated with a long head! That this tendency may be a factor making for still greater elongation will be discussed later.

Of the degenerative changes referred to above, two are especially important—namely, choroidal atrophy and detachment of the retina. The first, with the exception of the more malignant types, begins and is confined to the neighbourhood of the optic disk, but tends gradually to progress in a temporal direction and may encroach on the macula and impair or destroy central

vision. The earliest appearance is the myopic crescent at the temporal edge of the disk. In progressive cases this crescent slowly increases in size, its convex border advancing in the direction of the macula and its arms tending to surround the disk. In high myopia a true posterior staphyloma or bulging of the posterior pole of the eyeball develops. Atrophic stræ, radiating from the temporal side of the disk outwards to the macular area, often appear in the choroid and one of these may involve the fovea with disastrous effects on central vision. Other types of fundal lesion are also met with in high myopia but need not now be discussed.

The mechanism by which these changes are produced is not certain, but the compression theory, first described by Donders, is simple and points the way towards prevention. Briefly, the explanation is as follows: a myope holds his book very near the eyes to see clearly. His favourite reading position is one in which the neck is bent and the book held close to the face; in other words, one that entails undue convergence and undue depression of the ocular axes. During convergence each eye is compressed laterally between the two strap-like internal and external recti muscles; during depression mainly between the superior oblique and inferior rectus muscles. When convergence and depression are excessive, as in the reading position just described, this compression is considerable. The only parts of the eyeball that are not supported under this pressure are the anterior and posterior poles. Of the two the posterior pole is the weaker and tends to yield under the strain. Hence the production of a posterior staphyloma which, as it develops, exerts in its turn a certain amount of traction on the choroidal collar around the optic nerve. Ultimately this traction produces a crescentic area of atrophy adjoining the disc and marks out atrophic lines leading to the macula and indicating the direction of greatest stress.

The conditions that lead to detachment of the retina

in myopes are somewhat similar in character. Unlike choroidal atrophy, which develops gradually as a result of long continued strain of low intensity, retinal detachment develops suddenly in consequence of a single, abrupt, and relatively powerful effort. The details are by no means clear, but they involve as a final effect rapid and violent congestion of the choroidal vascular system. Such a state is produced by a special type of effort, e g one in which all the forces of the body—often quite unnecessarily—are called upon to make some unusual exertion, short in duration and characterized by closure of the glottis and contraction of the muscles of the trunk. The choroid is a richly vascular tissue; it may not inaptly be described as an erectile tissue. Its venous outlet is relatively meagre, so that all the conditions are present for a sudden and considerable rise of local pressure. In these circumstances the atrophic retina is sometimes torn, the actual site of the tear being determined probably by the presence of a small area of cystic degeneration constituting a weak spot. This occurs almost always in the upper periphery not far from the ora serrata. Once a tear occurs, fluid leaks through from the vitreous and separates the retina from the underlying choroid, constituting a detachment.

From the foregoing, it may be inferred that the care of the myope implies two things: (1) provision of glasses to correct his visual defect; (2) the prevention of complications such as the above. Of these the second is the more important.

With regard to the first, the kind and degree of the refractive error must be carefully estimated under a midriatic. As a rule, in moderate and high myopia—over 5 dioptries—a correction rather less than the full amount should be prescribed for constant wear. Astigmatism is fully corrected, but every precaution must be taken not to over-correct myopia. My practice in these cases is to aim at giving the patient about

six-ninths vision in each eye, i.e. roughly half a dioptré less than his full correction. Then, on testing binocularly, an additional half-dioptré is deducted if vision is not further reduced. The myopic eye is accustomed to hazy distant vision and, within limits, probably finds it more comfortable.

With regard to the prevention of complications, certain rules may be formulated. Reading and close work need not be prohibited unless central degenerative changes are already advanced. The amount of close work is of less importance than the conditions under which it is done. Large, clear printing type and a good light are essential, and on both these points the myope is notoriously careless. To prevent over-convergence and depression of the eyes in reading, the neck should be kept upright and the eyes almost level—a straight neck and level eyes.\* Efforts of the kinds described as liable to cause retinal detachment should be eliminated from the patient's activities; such as habitually holding the breath, lifting heavy objects, straining of all kinds, including straining at stool, coughing, sneezing and also stooping, and so on. Obviously, most of the exercises of physical culture are faulty and should be forbidden. Children with more than 5 dioptrés of myopia should not be subjected to the strain of ordinary school life. The methods adopted in the London County Council "myope schools" may be taken as a model of the way in which the education of the myopic child anywhere should be conducted. The teaching is largely oral, and reading and writing are practised at eye-level. In urban life the choice of a suitable occupation often presents difficulties.

Strict observance of these points throughout the years of growth would probably considerably reduce

\* The principles of correct posture and right bodily use are of great and unsuspected importance to every one, but to none more than to the myope. Exact knowledge on this subject is not widely disseminated. See F. Matthias Alexander *Constructive Conscious Control of the Individual* and *The Use of the Self* (Methuen & Co.)

the incidence of high myopia among adults and prevent, or at least limit, the extent of its various complications

#### THE TREATMENT OF CONVERGENT STRABISMUS

In the treatment of concomitant convergent strabismus, as in that of myopia, the optical consideration is not the only one. There is always the cosmetic question and there are still others, less obvious but equally important, which in their turn claim the attention and tax the resources of the ophthalmic surgeon. In the order in which they present themselves clinically these are as follows: (1) The prevention of amblyopia, or its treatment if already developed; (2) the establishment of simultaneous vision with both eyes, i.e. the cure of suppression; and (3) the education of binocular vision and the stereoscopic sense. The last is the ideal end-result of treatment, but seldom attained.

This variety of squint is a complication of hypermetropia on account of the excessive ciliary effort required to accommodate for distance and, still more, for near objects. Owing to the physiological relation between accommodation and convergence, such excessive accommodation is associated with excessive convergence. If the hypermetrope accommodates sufficiently to see clearly he tends to over-converge, and if he does over-converge he cannot accurately fix the object. His difficulty is solved by permitting over-convergence and suppressing the image of one eye. In other words, he acquires a squint and, by habitual suppression of the image of the squinting eye, in time develops in it amblyopia from disuse. Other factors are probably also present, e.g. a rudimentary development of the fusion faculty.

The primary step in treatment is to estimate the total hypermetropia under atropine and prescribe for constant use of glasses that correct a suitable proportion of the full amount. If treatment is begun early, that is before the onset of amblyopia, this may be all that

is necessary. Usually, however, squint manifests itself at an early age, often at 2, and amblyopia is already present when the patient is brought for treatment. The management of the case then enters its most difficult phase, in fact it may be said that the treatment of squint is one long fight against amblyopia. Various devices are employed to encourage use of the squinting eye; for example, occlusion for a period of the better eye. In my experience the type of occluder\* which has proved of greatest service is one which does not aim at total occlusion, but permits vision of the better eye on the temporal side. This position relaxes convergence, as the ocular axes approximate parallelism, and permits the retinal images to fall on corresponding retinal points. As the eye can be seen through it this type of occluder is not disfiguring. To handicap still further the better eye, it may be kept under atropine for a time, usually for six months.

When vision in the amblyopic eye has been improved to six-twelfths or six-eightieths, if squint is still present, the question of operation may be considered. The modern operation consists of advancement of the external rectus muscle and recession of the internal rectus, and the results are very satisfactory. Unless amblyopia has first been overcome there is always a danger of subsequent relapse in young children.

The final stage of treatment is the establishment of simultaneous vision with both eyes and the development of binocular fusion and the stereoscopic sense. True binocular fusion is said to be unattainable after the sixth or seventh years of life, so that every effort

\* The occluder referred to consists of two parts—a "half lens" of Chavasse glass which covers rather more than the nasal half of the spectacle lens, behind which it is worn, and a rubber projection that fits into the inner aspect of the orbit. The special glass permits a perfectly clear view of the eye and, at the same time, reduces vision to 6/60ths or less. The temporal rim of the occluder is straight and coincides with the outer margin of the cornea. The object of the rubber projection is to block up the space between the nose and the spectacle frame.



should be made to establish the necessary prior conditions at an earlier age. The stereoscopic sense is a relatively late acquirement in visual development and is not universally present even among non-squinting emmetropes. At the present time several types of apparatus, many of them extremely ingenious and some very elaborate, are available for the purpose of training this sense, and it is probable that, in the future, better results will be obtained. At the best, it requires sustained and constant supervision on the part of parents or others and, generally speaking, the ophthalmic surgeon has to be content with overcoming amblyopia and securing a good cosmetic result. The ordinary stereoscope with suitable pictures is not without value in fixing simultaneous vision. Once suppression has been satisfactorily overcome, attention to the exact correction of the refractive error is usually the only further practicable treatment.

#### CONTACT GLASSES

During the past two years or so a new principle has been introduced in the correction of ametropia—namely, the use of glasses worn in actual contact with the eye. This method of correction was first used for cases of conical cornea, a condition that can be relieved only to a very slight extent by ordinary spectacles. Its application, however, is now being actively extended to the treatment of all errors of refraction, often with remarkable success.



FIGURE 1

The Zeiss ground contact glass (Fig. 1) is a thin transparent bowl which fits on the anterior part of the eyeball beneath the lids, in contact with the sclera, but separated from the cornea by a fluid meniscus. It consists of two parts, viz., a central optically effective crown, which forms an arc of a sphere, and a peripheral, optically ineffective brim, which is also spherical. The former may be called the corneal portion; the latter the sclerotic. The diameter of the whole glass is about 20 mm., its central thickness about 0.5 mm., and its weight about 0.5 gram. (grs. 7). It is thus easily carried by the eyeball in its movements around the centre of rotation.

Contact glasses are inserted as follows: The conjunctiva is anæsthetized by a drop of 2 per cent. holocaine. The glass is picked up by means of a small rubber sucker and filled with normal saline solution. The patient leans forwards and the surgeon, while controlling the eyelids with the fingers of one hand, with the other inserts the lower rim of the glass into the lower conjunctival fornix. He next gradually apposes the glass to the cornea, being careful not to spill the fluid, and allows the upper eyelid to fall into position over it. The sucker is now removed. The method of insertion is easily acquired; patients are able to do it themselves in a surprisingly short time. The only difficulty is that sometimes a bubble of air appears between the cornea and the glass. With experience, however, this occurrence becomes less frequent. Removal is also affected by means of the sucker.

As might be expected, patients vary with regard to the ease with which tolerance is acquired, but, when the scleral fit is exact, practically every patient can wear contact glasses for at least six hours and many for the whole day. They are inserted in the morning and removed at bedtime.

The principle underlying this means of correction is

the fact that the refractive indices of cornea, fluid meniscus, and contact glass are practically the same. It is thus possible to superimpose upon a cornea of faulty curvature another cornea of pre-designed curvature, viz., a fluid meniscus imprisoned between the cornea and the glass. It is the fluid meniscus that effects correction and, as it is of the same refractive index as the cornea, the latter ceases to function optically. Astigmatism, therefore, is abolished and such a radius of curvature may be given to the fluid cornea as will ensure exact focus of an image on the retina in all varieties of axial ametropia. In other words, hypermetropia may be corrected by prescribing a contact glass of small radius of curvature and myopia by prescribing one of long radius.

Optical correction by means of contact glasses presents few difficulties. Scleral fitting, unfortunately, bristles with difficulties and requires experience and patience for its exact determination. Comfort and tolerance depend almost entirely on its correctness and, in arriving at a decision, allowance must be made for variations in thickness of the conjunctiva, which alters not only from patient to patient, but also from time to time in the same patient.

It is clear that this method of correction approximates more closely than does spectacle correction to the conditions that obtain in the normal eye. Thus, monocular perspective is more accurate; binocular fusion, even in cases where considerable disparity exists between the two eyes, is easier; and a full field of vision is available. It is indicated equally in myopia, aphakia, and high astigmatism, and has a definite place in the treatment of corneal disease and in certain surgical procedures.

# The Treatment of Pneumonia

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PNEUMONIA is no respecter of persons; its mortality is high, and it is estimated that 15 per cent of the patients will die in spite of all treatment. Whereas the diagnosis is easy, and can usually be made at sight by a trained nurse, the prognosis of the individual case is always uncertain. As about 75 per cent of the patients recover, whatever treatment is adopted, there has been great diversity in treatment, and it is difficult to estimate the value of different methods of treatment. Variations in the virulence of the infection, and in the resistance of the patient, add to this difficulty. J. A. Lindsay<sup>1</sup> reported variations in mortality from nil to 40 per cent. in similar circumstances in two periods of two years.

There is a widespread feeling in the medical profession that the less you do for a case of pneumonia, the better the result. There are several reasons for this opinion, one is the natural tendency of the disease to run a well-defined short course ending in recovery, another is the realization of the utter exhaustion which most patients experience, and a third reason is a healthy scepticism as to the value of any particular drug to influence the course of the illness. For centuries treatment has been symptomatic, though the forms of treatment have changed. Patients are not now treated with huge doses of alcohol, tartar emetic or mercury, nor by copious bleedings; but we use drugs and methods which modern experience has shown to be valuable, whether or not we can explain their action, or strike a favourable balance between their various physiological or pharmacological properties. There has been great difference of opinion over the

value of some of the most commonly employed remedies, such as alcohol, digitalis, expectorants, morphine and oxygen. These differences will be resolved by a combination of clinical experience and laboratory experiment, by co-operation between the physician, the physiologist, and the pharmacologist

The day of the supremacy of the symptomatic treatment of pneumonia may soon pass, and with it the dread of the disease, as has happened in the case of diphtheria. The last few years have seen the rise of a specific attack on the disease in the form of treatment by specific antiserums, which bids fair to shorten the course and reduce the mortality as no forms of symptomatic treatment have ever done. At present there is not any specific drug for pneumonia, analogous to quinine in malaria. Until this treatment by specific antiserums is made universally available, we must rely on what we believe to be the best forms of general management and medicinal treatment of our patients. The remarks which follow have special reference to adults, and for the most part are equally applicable to lobar pneumonia and to broncho-pneumonia

The usual *cause of death* in pneumonia is heart failure, which supervenes as the combined result of exhaustion, anoxæmia, and toxæmia. The signs and symptoms which we have learned to dread are prostration, cyanosis, low blood-pressure, hyperpyrexia, and extreme rapidity of pulse and respiration. The factors contributing to the exhaustion of the patient are pain, cough, insomnia, lack of nourishment, and various minor causes.

*Pain* may be due to pleurisy, or to the muscular strain of constant coughing. It is common knowledge that the sharp, agonizing pain of pleurisy disappears when effusion occurs, separating the inflamed layers of visceral and parietal pleura and abolishing the friction sound, possibly the mere occurrence of œdema in the pleural membranes and sub-pleural tissues

relieves tension on the sensitive nerves of the parietal pleura, and thus brings relief from pain. Hence we apply counter-irritants to the chest to aid effusion or oedema. The best type of application for this purpose is a poultice; a medicated preparation such as antiphlogistine, cataplasma kaolini or colloplasma has an advantage over simple poultices made from bread or linseed meal. Such a poultice should be renewed every twelve hours while the pain persists, with as little disturbance to the patient as possible; it should not be applied so hot that it blisters the skin, and should be discontinued as soon as the pain disappears, it has no value in aiding resolution in the affected lung.

Blistering by a mustard leaf or cantharides for the relief of pleural pain is to be deprecated. Strapping the affected side of the chest to reduce movement, and hence pleural friction, will ease the pain, but it interferes with examination, will hamper respiration, and may damage the skin. The patient may find relief from pleuritic pain if laid on the affected side with a pillow under that side of the chest. The production of an artificial pneumothorax by the injection of a few hundred c.cm. of air as advocated by Wynn<sup>2</sup> and Taylor<sup>3</sup> will have the desired effect, but the method is not generally practicable.

When pleuritic pain prevents sleep early in the illness, and so exhausts the patient, there need be no hesitation in giving morphine hypodermically, gr.  $\frac{1}{6}$ – $\frac{1}{4}$ , or heroin hydrochloride, gr.  $\frac{1}{12}$ – $\frac{1}{6}$ , repeated every twelve to twenty-four hours if necessary. At this stage of the illness, the gain to the patient in sleep and in deeper painless respirations far outweighs the slight disadvantage to the action of the bowels, kidneys and respiratory centre. The same applies to the use of morphia for the ineffective, painful and exhausting cough of the early days and nights, when for hours together the patient may be racked by acute pleural pain every few minutes in the effort to dislodge a tiny

value of some of the most commonly employed remedies, such as alcohol, digitalis, expectorants, morphine and oxygen. These differences will be resolved by a combination of clinical experience and laboratory experiment, by co-operation between the physician, the physiologist, and the pharmacologist.

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the patient's chance of recovery by increasing irritation and secretion in the bronchial tubes outside the pneumonic area. Some patients will pass through the illness almost without any cough or sputum, and to this fact they may owe conservation of strength which largely ensures their recovery. The fact that pneumonia may run its course without a cough, whereas bronchitis is always accompanied by coughing, suggests that the early cough is due to associated bronchitis and not to the pneumonia *per se* (except in so far as it may be pleural in origin), and is an argument in favour of withholding expectorants in the absence of a troublesome cough. Certain it is that cough becomes less in evidence as the days pass, and is only troublesome late in the disease if there is much bronchial secretion, for the great bulk of the pneumonic exudate is reabsorbed by lymphatics.

*Loss of sleep* means not only physical exhaustion, but also leads to mental distress and depression, for the sleepless patient takes a more serious view of his illness, and is agitated by thoughts of what may be the consequences to his family if he should not recover. In the early days of the illness, "sleep at any price" is almost a justifiable maxim. In speaking of pain and cough which prevent sleep, we have seen that morphia or its allies are safe, and should be used without hesitation in doses that prove effective. But insomnia may be present in the absence of serious pain or cough, and under these conditions various hypnotics may be given, alone or in combination, such as aspirin, gr 10-15; bromides, gr 20-30; chloral hydrate, gr. 10-15; allonal, one or two tablets, medinal, gr 7-10. A very useful prescription is aspirin and Dover's powder, each gr 10-15. Whisky or brandy, 2 oz. in hot lemon water, is often effective.

Apart from medication, sleep may be induced by simple measures of general nursing, such as warm sponging, a hot drink, comfortable arrangement of



pillows and bedclothes, shading of the light, pleasant ventilation of the room, and even retiring of the nurse to some convenient place outside the sick-room. Noise should be avoided as far as possible, even in entering and leaving the room, or in attending to the fire, it is preferable to exclude street noises by closing the window, and to trust to the open fire and open door for ventilation. In my opinion an open fire is to be preferred to a gas fire or an electric stove, the patient is more comfortable and the ventilation better. Bedclothes should be warm, but light in weight, a cotton blanket next to the patient is much appreciated. It is a mistake to load the bed with clothes which oppress the patient in his slightest movement.

Late in the disease, it may prove almost impossible to secure sleep or restfulness, and to do so by the aid of opiates may mean fatal depression of the cardiac and respiratory centres.

*Nourishment* is important in maintaining strength and in combating toxæmia. During the acute stages of the illness fluids in almost any form may be allowed; water, soda-water in moderation, milk diluted, citrated or peptonized; Benger's food, Horlick's malted milk, weak tea or coffee, Ovaltine, broths, lemonade, orangeade, barley water. Glucose or plain sugar are valuable as foods and as cardiac stimulants. It should be the aim of the nurse to induce the patient to take at least two pints of milk in the twenty-four hours, and an equal quantity of water, the drinks may be given hot or cold as the patient prefers, but in small quantities frequently. Oranges, grapes and pears may be given if the patient enjoys them. When the desire for solid food returns with the fall of the temperature and pulse, this desire may safely be gratified; it is then a mistake to deny food to the point of hunger for any theoretical consideration.

*Minor causes of exhaustion*—While attempting to minimize exhaustion by attending to pain, cough and

insomnia, we must not forget certain minor matters in the management of the case. At the first suggestion of pneumonia the patient must take to his bed, literally and completely, and be saved every exertion possible. He must remain recumbent; the bed-pan must be used from the first; he must not reach for drinks or the sputum cup, nor rearrange himself on the bed, nor attempt to shave or wash himself. While the nurse should do all these things for him, there is a real danger that she will tire him by too assiduous attention to washings and to toilet. It is more essential that he should be comfortable and rested than that he should be washed and tidied in readiness for his practitioner's visits. A patient may be so weak that to have face and hands washed may be as much as he can endure with comfort at one time. In this state it is important that he should be disturbed as little as possible for the changing of clothes wet with perspiration, for the renewal of poultices, and for examination by the doctor. For the same reason an enema daily is preferable to any aperient after one has been given at the onset of the illness. The patient may be allowed to lie in the position which he finds most comfortable, an air ring suitably inflated being used to prevent undue pressure on the sacral region or hips.

*Cyanosis* in pneumonia denotes a lack of oxygen in the blood; this has been abundantly proved by analyses of venous and arterial blood <sup>5, 6</sup>. This lack is due to the inability of oxygen to reach the blood in sufficient concentration, and not to inability of the blood to take up oxygen. The fact that cyanosis may appear early in the disease, without any marked obstruction of respiratory passages or of respiratory movements, and before the appearance of any appreciable consolidation, suggests that the alveolar epithelium is damaged by toxins as regards its respiratory function. To the cyanosis which occurs later there are many contributing factors, such as previous damage to the

lungs or heart, restriction of respiratory movement by thoracic deformity, by pain, by constriction of bandages, by the pressure of clothing, or by abdominal distension as from meteorism or pregnancy. Extensive pulmonary consolidation, the presence of pleural effusion, or reflex paralysis of the diaphragm, and the failure of the heart muscle, are factors incidental to the disease.

We can avoid constriction of the chest, we can annul pain by morphia; we can relieve meteorism by a turpentine enema, a rectal tube, or a hypodermic injection of pituitary extract. But, from whatever cause the anoxæmia arises, the important question for treatment is *Can we increase the percentage of oxygen in the air reaching unaffected portions of the lungs?* The answer is in the affirmative, both on clinical and chemical evidence. There are many who say that they have never seen oxygen do any good, and it is true that the patient and his friends often think the giving of oxygen is an evil omen. This is because oxygen is either given too late, or is given in a manner which cannot possibly ensure a sufficient concentration in the healthy alveoli. It should be given at the first sign of cyanosis, indeed, some physicians recommend that it should be given more or less continuously from the commencement of the illness. But if given by a funnel held somewhere near the patient's mouth it has no therapeutic value whatever; the funnel must be held closely over the mouth and nose for any appreciable benefit to follow. Better than the funnel method is the nasal catheter strapped in position,<sup>7</sup> or a mask with a valve which opens easily on expiration. Given thus, very appreciable results are seen in the relief of cyanosis, and in the increased general comfort of the patient; restlessness may cease, delirium be calmed, even cough be subdued, and sleep ensue. The frequency and duration of its administration must be determined by the condition of the patient, for its effect is only temporary. It may be given continuously,

or for five to ten minutes every half-hour or hour. Portable tents and oxygen chambers are as yet scientific rather than practical interest. Passage of oxygen through alcohol has no advantages, nor is it necessary that the oxygen should be warmed between the cylinder and the patient.

The method which I have employed during the four years, in some hundreds of hospital cases, is the mask method, using the "Apneu" inhaling apparatus, which the oxygen at a measured rate of flow (3-5 l. per minute) is passed through oily solutions of drugs such as adrenaline, camphor, and menthol. Rarely do patients resent the mask, frequently ask for the inhalation to be repeated, and all medical men and nurses who have watched the treatment have been greatly impressed with its relieving symptoms.

*Heart failure* rather than respiratory failure is the usual mode of death in pneumonia. This comes as the combined result of exhaustion, anoxæmia, and toxæmia. The more we can do to conserve the strength of the patient, to prevent anoxæmia, to combat toxæmia, indirectly or directly, the better chance we shall have of saving the heart, and the patient. Our whole aim in symptomatic treatment is to keep the patient alive until sufficient antibodies have been formed to overcome the toxin and produce immunity.

The question of the nature and value of stimulants has long been a very vexed one. The use of digitalis has been widely questioned, largely on account of pharmacological teaching. But it is impossible to reproduce human conditions in a laboratory animal. Those clinicians most competent to bear critical judgment to bear on their experience have expressed the opinion that digitalis is of value and should be given early in large doses, in order to produce the desired effect when the heart is feeling the strain.

the illness.

The condition of the heart at the onset of the illness, with reference to the age of the patient, and to previous disease, is a guide to the wisdom of giving digitalis early. The tincture, or dignutin, may be given in doses of 10 minims every six or four hours, or the infusion in doses of 2-4 drachms equally often. Nativelle's digitalin, gr.  $\frac{1}{240}$ , given every six or eight hours is another reliable method of stimulating the heart. Digitalis has no appreciable effect in slowing the heart, but acts by increasing its power; it is of very certain benefit in cases of auricular fibrillation, whether pre-existent or occurring during the course of the illness. John Hay<sup>8</sup> expressed a widely accepted opinion when he said: "I believe we are justified in looking upon the routine exhibition of digitalis as of value."

Though strychnine may not be a direct cardiac stimulant, it acts on the cardiac and respiratory centres as a stimulant, and its use is justified. Caffein, gr. 5, in a mixture, or as coffee, is a useful cardiovascular stimulant, as is also camphor given hypodermically in olive oil in gr 3-5 doses, or as coramine, 1 c cm. In sudden failure of the pulse, with restlessness and distress, strophanthin, gr.  $\frac{1}{100}$  may be injected intravenously. For falling blood-pressure, pituitrin,  $\frac{1}{2}$ -1 c.cm., and adrenaline, minims 5-10 of a 1 in 1,000 solution, given hypodermically, are undoubtedly of service. Mention has been made of glucose as a cardiac stimulant, in emergency it may be given as a 10 per cent. solution intravenously in 200-250 c.cm of normal saline, and repeated if necessary in twelve hours.

*Alcohol* has a deserved place in the treatment of pneumonia, though not for its value as a cardiac stimulant, as is generally supposed. It is a cardiac depressant, but its disadvantage as such, in a short illness, is offset by its value as a soporific, as a dilator of the superficial vessels encouraging sweating, as a

food, as a comfort to those who like it, and as a necessity for those addicted to it. The sudden deprivation of alcohol from a pneumonia patient who is addicted to it is often followed by delirium tremens, the prognosis in alcoholics is very grave from the start, but there is more to be gained from the giving of alcohol, in large doses, than from its complete withdrawal.

*Toxæmia* is attacked by every measure which helps to maintain strength and prevent anoxæmia; nourishment, sleep, the abolition of pain, the relief of cough, fresh air, and oxygen contribute to this end. The elimination of toxins is promoted by the encouragement of diuresis and sweating; active purgation, though also effective in the same way, is to be avoided on account of the exhaustion which it causes. Perhaps there is no better mixture for these purposes than one containing solution of ammonium acetate, 2-4 drachms, and potassium citrate, gr 20-30, every four hours. There is reason to think that this combination helps also in combating acidosis, and in lessening the tenaciousness of the sputum. Diaphoresis is also aided by alcohol and warm sponging. If in spite of these measures hyperpyrexia supervenes, resort must be had to cold sponging or to rubbing the limbs with ice. Unduly rapid action of the heart is sometimes checked by an ice-bag placed over the præcordium; for very rapid respiration nothing is so effective as oxygen, except where the tachypnœa is due, not to toxæmia, but to pain or fright, when morphia is safe and effective. Diarrhœa is a serious symptom of toxæmia, and is very exhausting to the patient; an attempt may be made to check it by giving five drops of chlorodyne, repeated with caution as necessary.

For violent delirium late in the illness, nepenthe, minims 30, by mouth, or hyoscine hydrobromide, gr.  $\frac{1}{100}$  hypodermically, may be effective; if the lungs are fairly free from secretion and the airway is good, morphia may be injected, gr.  $\frac{1}{8}$  to  $\frac{1}{4}$ , every eight or

twelve hours for three or four doses, combined with atropine sulphate, gr.  $\frac{1}{100}$ . Often we find that cold sponging and inhalation of oxygen, with manual restraint as required, will have the effect of calming the delirious patient to whom we hesitate to give morphia.

At the crisis it is well to give brandy by the mouth and cardiac stimulants hypodermically if there are signs of collapse. When the crisis is delayed, and the temperature and pulse remain rapid without obvious fresh areas of consolidation appearing, and especially where shivering or sweating are marked features, empyema must be suspected, and exploration with a needle be performed without hesitation. Careful X-ray examination may be required to reveal the presence of a small interlobar effusion when the clinical and blood pictures suggest the presence of sepsis.

The specific treatment of the toxæmia by *anti-serums* has followed the discovery that the pneumococcus can be classified into three strains or types causing the great majority of infections, and a large group causing a small minority of infections. Types I and II are responsible for between half and two-thirds of the cases of lobar pneumonia, and for these types effective anti-sera have been obtained, which have reduced the mortality by 10-20 per cent. in large series of carefully controlled cases.

There are many difficulties and disadvantages to be overcome before the serums become universally applicable. At present the cost per case is something like £15-£20; the serum must be given intravenously, at eight- or twelve-hourly intervals for five or six doses; the quantity per dose has been reduced from 100 c.cm. to 10 c.cm. in Felton's concentrated serum for types I and II. To have its maximum effect it must be given as early as possible in the disease. To determine the type of pneumococcus present requires

expert laboratory work, and takes time; moreover, there are fallacies in typing from the sputum, which at first may yield another pneumococcus than the one causing the illness, since avirulent pneumococci occur in many mouths. Moreover, sputum may be absent for several days. Blood culture takes time, and is often negative in result. All these difficulties have led to the practice of giving the concentrated sera for types I and II together, as soon as a diagnosis of lobar pneumonia is made; if typing reveals that one or other of these types is causative, valuable time has been saved; if not, no harm is done to the patient. Anaphylaxis is rare, and may easily be countered by the hypodermic injection of adrenaline.

Reports on the trial of this serum (Felton's concentrated serum for types I and II) have been published recently in this country from the Royal Infirmaries of Edinburgh<sup>9</sup> and Glasgow,<sup>10</sup> and from St. Bartholomew's Hospital,<sup>11</sup> all of which reports tend to confirm the claims made for the serum in America.

The treatment of acute pneumonia by *vaccines* has few advocates and many opponents, but W. H. Wynn<sup>12, 13, 14</sup> claims that dramatic improvement follows the giving of large doses of vaccine early in the disease. For lobar pneumonia he uses a stock vaccine made from various virulent strains, and injects a hundred million at the earliest possible moment. If this can be done within twenty-four hours of the onset, pyrexia and the general symptoms are aborted within another twenty-four hours, and the temperature will remain down, though consolidation and rusty sputum are present; when treatment is begun after the first day the vaccine may have to be repeated, but will still markedly influence the course of the disease. For broncho-pneumonia he uses a mixed vaccine of pneumococci, streptococci and influenza bacilli. Although early diagnosis, and hence early administration of the vaccine, are more difficult than in lobar pneumonia,



the results of treatment are scarcely less remarkable.

*Other remedial measures.*—*Diathermy* has been used in America much more than in this country, at the best it is but a form of applying heat to the deeper tissues, which promotes circulation through the affected part. The expense of the apparatus, and the need of a trained operator and a suitable current, make it impracticable for general use; moreover, its exponents do not make any startling claims for its value, and others have failed to confirm such claims as are made. A satisfactory case has not been made out for the value of sodium nucleinate, for immunogens, for polyvalent anti-pneumococcic serums in combating the toxæmia, or for S.U.P. 36 as a reliable antipyretic and detoxicator. *Venesection* is of proved value in rare cases when the patient is restless and cyanosed, with evidence of venous engorgement in the neck and dilatation of the right side of the heart; the withdrawal of six to twelve ounces of blood by section of a vein at the elbow, or preferably through a needle of large bore, will sometimes give marked relief.

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# Dietetic Facts, Fads and Figments

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IT is not surprising that such remarkable diversity of opinion exists on the subject of dietetics, for everybody regards himself as an authority. This, so far as his own requirements are concerned, is probably true, but his personal experience does not justify the familiar sequel of assuming and asserting that what suits him must be the best for the rest of the world. I doubt whether we ourselves are much better than the laity. We are not a little inclined to forbid our patients those things which we dislike, and, with the emphasis of authority, our pontifical utterances do not admit of argument. Probably we suffer no less from the danger of obsession, and the qualified crank may be a bigger nuisance and certainly a greater public danger than the amateur who may at any rate be ignored on the ground of ignorance.

Fundamental principles we know remain unassailed and valid for decades and possibly for all time, but the unequivocal facts about diet are really very few. We can start with the unquestioned and unquestionable postulate that everybody must eat and that the daily dietary must have a certain minimum and a certain optimum calorie value which, whatever its composition, must comprise a minimum (not necessarily an optimum) quantity of protein generally calculated at  $\frac{2}{3}$  gram for every kilo body weight. Those elusive substances the vitamins must also be present, together with various mineral salts and a quantity of indigestible residue or "roughage." But beyond these general propositions it cannot be said that dogmatism is justified.

We can utilize the results of an enormous accumulation of experiments to calculate irreducible minimums and apparent optimum values in the average instance. Such conclusions need not necessarily be right even as general propositions, they will certainly be wrong in a Procrustean application to any and every individual.

As regards protein, the indispensable factor of any dietary, the margin is probably enormous, between 50 and 150 grams per day. Chittenden, it will be remembered, broke new ground by showing that nitrogenous equilibrium was possible on a much lower figure than that hitherto accepted, though Chittenden's results are open to considerable doubt. On the other hand, whilst protein is indispensable, an excess is a source of danger to the organism, though some very rare exceptions are occasionally encountered who can exist on a "straight meat" diet. The majority of people adjust themselves to a ration of 100-120 grams per day. The proportion between carbohydrate and fat may vary considerably, and it is interesting to observe how even among authorities there is no agreement regarding the minimum of carbohydrate compatible with health, a subject naturally of paramount importance in the treatment of diabetes. Joslin emphasizes the danger of producing arteriosclerosis if diets are administered over a long period containing less than 100 grams carbohydrate daily, yet the Eskimos certainly live long and contented lives on a diet with total carbohydrate not exceeding 35 grams. The truth may be, in fact, the very opposite, if one remembers the preponderance of carbohydrate in the diet of the poor in whom there is no difficulty in identifying arteriosclerosis. The capacity for burning fat -- for storing it in quantity to be used when necessary -- is greatly. The craving for sweets, reprobated in ~~as~~ a perversion, may indicate the instinctive desire ~~for~~ carbohydrate to overcome a faulty fat combustion ~~and it~~ may be said that there is nothing to

gain by an attempt to calculate a diet on scientific principles rather than to rest content with the average which must result from day-to-day variations in appetite and circumstances. Probably more danger exists of over-eating rather than under-feeding. Yet a margin for safety seems desirable if a diet is constructed on the basis of energy requirements and caloric values

### “NATURE CURES” AND OTHER CULTS

A rapid glance at the various cults associated with diet in the remote past, the recent past and the present, recalls the Salisbury diet, sour milk, the vogue of the Fletcherites, who not merely gave two bites to a cherry but masticated milk, the vegetarians with their numerous modifications, the fruitarians, the nutarians, the advocates of one meal a day, and the apostles of complete starvation.

To establish a following for a freak diet it is generally necessary to forsake all accepted physiological principles and introduce an element of mystery or resort to that very convenient question-begging epithet “Back to Nature.” True, there is sometimes some basis for the principle adopted, such as modifying the flora and fauna of the intestine, though quite apart from the possibility of any advantage resulting it must be remembered that a radical change of diet, like a radical change of any kind, is very stimulating for a time. So far as the others are concerned, they nearly all have one factor in common, they are all forms of partial starvation. And they all have one common feature, that a definite time limit is imposed, which is just as well. There is a suggestion of elaborate scientific calculation when a certain time-table is arranged, but the rationale is nearly all window-dressing, whilst the real advantage is that in this way dangerous asthenia or acidosis are avoided. The grape-cure, now apparently out of fashion and favour, had a peculiar advantage in ensuring a sufficient amount of exercise in

plucking the fruit to be consumed

So far as the cry "Back to Nature" is concerned, some obvious objections are pertinent. In the first place, what is the use of forgetting that civilized man is no longer in a state of Nature and that the effects of hundreds of generations prevent any violent attempt to adapt him to a dietary as if he were? Secondly, how do we know what man's habits and conditions in a state of Nature were really like? What justification is there to idealize primitive man as a beautiful, healthy, clean-living, water-loving savage who may after all have been a mass of corruption, prematurely senile and subject to all manner of diseases? Some attempt is made to make capital of the infrequency of certain diseases, especially gastric ulcer and malignant tumours, among savage races who abstain from meat. The majority of us are compelled to accept second-hand evidence on this subject; and careful consideration of the facts leads to considerable scepticism. Statements relating to the incidence of gastric ulcer are, in these circumstances, not of much value. How is it possible to recognize cases when the proper diagnostic aids are rarely available and the careful anamnesis which is so essential in gastro-intestinal investigations is prevented by the difficulty of language as well as the lack of intelligence? As regards malignant disease, the average native does not live as far into the cancer age as the European. Furthermore, Sir Leonard Rogers found that sarcomata were twice as frequent in Bengal as in London.

A recent opportunity for a control experiment was afforded by comparison of two native tribes, the Kikuyu and the Masai, living in close proximity. The former exist entirely on vegetables, the latter take meat, blood and milk. Neither tribe reached European standards, but the average height of the Masai is 5 in. more than that of the Kikuyu, and his strength as measured by the dynamometer is 50 per cent greater. Among the vegetable-eating Kikuyu the incidence of

gastric ulcer, rickets and practically every disease except intestinal stasis is far more frequent.

### VEGETARIANISM

So far as vegetarianism in civilized countries is concerned, the promoting motive or impulse is generally easily recognizable. In some instances it is simply the desire to be different from the majority, so conferring upon oneself a sort of superiority. In other cases the reason is an æsthetic one, and it must be admitted that the spectacle of carcasses and joints of meat exposed for sale with all sorts of undesirable accompaniments is revolting to a sensitive mind. In other cases the objection is humanitarian; but whatever the original impulse, which may be worthy enough and deserving of sympathy, the devotee finds it necessary to claim all virtues for it and to condemn animal food unreservedly.

It is well, however, to be certain what is meant by vegetarianism. In most cases milk, eggs, and cheese are included, and these are just as animal as a chop, and may on occasion be fully as revolting. If purely vegetable foods alone are taken, it may be stated without exception of any kind that the alimentary canal of man is incapable of manipulating sufficient to ensure the minimum calorie value. To take one example, to obtain 54 grams of protein, 6½ lbs of potatoes would be required. But if the highly-nutritive animal foods referred to are included, it may be merely a matter of individual taste how the calories are collected, although there is good reason to believe that animal protein, and especially that of meat, is superior to vegetable protein independently of mere calorie value.

On rare occasions a so-called vegetarian who distinguishes himself as an athlete or "strong man" is quoted as an instance of the advantages of the cult. It would be as foolish to deny that this sort of diet may be the most suitable for this particular athlete or to

desirable As a fact, cases of vitamin deficiency in adults are very rare It has been estimated that if the monotony were not unendurable, it is possible even at the present cost of food to live healthily for 5½d. a day on 7½ oz. fresh herring, 1 lb 7 oz. oatmeal, and 4 oz. cabbage, which yield 108 grams protein, 74 of fat, and 470 carbohydrate, approximately 3,000 calories, and with a sufficiency of vitamin A in the fish, of B in oatmeal, and C in cabbage, as well as calcium, phosphorus, iron, sodium, potassium, iodine, and roughage In adults, save in beleaguered garrisons, vitamin deficiency would be possible only in a partisan of a preposterously freak diet or in chronic alcoholics or the most ignorant, degenerate, and destitute It is admitted that the poor in a large city take in their diet a small fraction of the total amount of vitamin consumed by the rich. They may be somewhat more susceptible to disease, but not markedly so To find a considerable increase in mortality in lobar pneumonia and tuberculosis we have to descend to the lowest levels of poverty, thriftlessness and want And in these circumstances there are other factors besides vitamins.

#### POPULAR MISCONCEPTIONS

It would require a disproportionate time to refer to the almost innumerable misconceptions which are traditional in regard to articles of diet Bread, which is hailed as the staff of life, is, unfortunately, a slender reed as a sole support. Its cheapness is its chief recommendation, and so it bulks largely in the dietary of the poor, whose stunted growth is often the result of protein deficiency. Eggs, with their vaunted content of "meat," contain protein of good quality, fat and vitamins A and B, with phosphorus, iron and calcium, whilst the absence of purins is a recommendation. But they are an expensive food for which milk, butter, and green vegetables are better substitutes.

The ambition of Napoleon is said, in picturesque

language, to have been responsible for fewer deaths than those which have resulted from a confidence reposed in the nutritive value of beef-tea. There is a widespread belief in the power so to concentrate food that the time and energy dissipated by digestion may at some future date be obviated by the provision of highly concentrated food in tablet or similar forms. It may be possible to concentrate all the *flavouring* agents into a comparatively minute compass, but so far as nourishment is in question the minimum volume of a day's food is about a pint.

Although Gee said many years ago that a little food by the mouth is better than a great deal by the rectum, only within recent date was it shown that the bowel is incapable of absorbing anything other than water and glucose. Most of us can remember the extraordinary mixtures injected as "nutrient enemata"—milk, eggs, beef tea, pancreatized meat, and so on. The rectum, a poor judge of quantity, is a very good judge of quality.

#### DIET IN DISEASES

The part played by dietetics in the treatment of disease can be considered under the headings: diseases of the alimentary canal, in which mechanical principles should be the chief consideration, and constitutional diseases, upon which the influence of diet is unlimited according to the ideas, prepossessions, and often obsessions of the practitioner or dietitian. Many enthusiasts believe that suitable diet will cure all ills except a few that require surgery, and even these will not be admitted by the extreme enthusiasts. The shifts employed by some physicians to avoid anything of the nature of a drug are almost ludicrous. In a reluctance to administer a simple aperient they will substitute great masses of foodstuffs which produce gaseous fermentation and a large residue of undigested starch. Diet looms largely in the treatment of diabetes,



obesity, gout, nephritis and arteriosclerosis, malnutrition, febrile states, and, to a lesser extent, tuberculosis. *Diabetes* well illustrates fashions in dietetic treatment which we ourselves have witnessed within two decades · the Naunyn treatment, Allen's system, Joslin's balanced diet, the high fat diet, the use of insulin, and, at the present day, the high carbohydrate diet, which is not universally accepted.

Regarding *obesity*, there is a widespread belief that certain foods possess in themselves a mysterious reducing or thinning capacity. The actual position of diet in obesity is simple enough. Provided that the caloric intake is less than the output and he does not develop starvation œdema, a person cannot fail to lose weight unless he finds some supernatural means of violating the law of the conservation of energy. The trouble in treating obesity is that the subject will not co-operate with sufficient seriousness; he really desires what we know could only be a miracle. Most sufferers have a gross misconception of the quantity they eat, especially overlooking the unconsidered trifles which collectively are of importance. An extra pat of butter at every meal may mean 25 lbs. excess in a year. It may be, indeed it must be, that some people have greater economy than others in digestion and in the performance of muscular tasks, and here it is that so-called endogenous obesity with ductless gland imbalance enters into consideration. Yet in these, as in all others, loss of weight is inevitable if intake is less than output. It is doubtful if restriction of fluid in the treatment of obesity has any justification save that such restriction tends to discourage excess of food.

In the treatment of *chronic nephritis* and *arteriosclerosis* there is rightly a desire to restrict nitrogenous substances, but the time-honoured prejudice against red meats as opposed to white has no basis in fact. Furthermore, the value of the care with which protein is cut down is reduced by the realization that if we

restrict it below 30 grams a day we compel the patient to extract it from his own body with no less effect upon his kidneys.

As regards *tuberculosis*, the relation of fat soluble or intolerance is too well known to require further reference. The latest complicated diet includes high vitamin content, low sodium chloride, but excess of other mineral salts. Naturally, if encouraging results occurred from its wide application, the various factors would have to be tested out one by one to identify that responsible. Much work still remains to be done upon the possible application to the treatment of disease by alteration of sodium chloride, calcium, and other salts in the diet.

In the dietetic treatment of organic diseases of the *alimentary canal*, the mechanical factor requires chief consideration in the attempt to ensure physiological rest. It is fully appreciated that complete rest is impossible, and the compromise is accepted of reducing secretory and motor stimulation to a minimum by restricting highly flavoured foodstuffs and everything with irritating properties or a residue, and, in the case of a peptic ulcer, of endeavouring to produce a perpetual alkaline milieu on the principle that acidity is inimical to healing. Whatever system of dietetics is employed, complete recumbency is a *sine quâ non*, and doubtless one advantage of certain comparatively complicated regimes is that recumbency is compelled. We may certainly deprecate those graduated systems which suggest that an ulcer heals daily to an extent commensurate with the alterations in diet. Medical treatment should embody a rigid diet until the ulcer is healed, a time limit which, unfortunately, it is impossible to determine. The anxiety to ensure a non-residue diet in the treatment of typhoid fever and such conditions as ulcerative colitis has led to an exaggerated stringency; the nutrition of a patient already attenuated has seriously suffered from the

additional starvation-regime; and a fairly liberal diet is desirable and permissible so long as obvious residues are eliminated.

As regards the treatment of *functional dyspepsia*, the less attention paid to diet the better. We are on the whole disposed to be far too fussy in response, no doubt, to the almost universal expectation and request for a dietary and the refusal of a patient to believe that without such a guide he may be receiving suitable advice. Our own ideas of the digestibility of foodstuffs are drawn from the original researches upon the average duration of their sojourn in the stomach, and this we now appreciate to be quite fallacious since digestion in the stomach is far from complete. In fact, the more quickly the food leaves the stomach the less it is digested.

One type of patient will resent the provision of a printed sheet of dietetic instructions and expect an elaborate scheme which implies individual consideration. He is right so far as functional dyspepsia is concerned, yet wrong when he supposes that any physician can guess his idiosyncrasies. The printed sheet has at least the recommendation that it deals with general principles; and although perhaps over-elaborating the obvious, anticipates the difficulties of the ignorant. Routine treatment of this kind is, however, more suited to organic disease of the viscera, and so far as functional disturbances are concerned, the physician would be far better occupied in investigating the psychological, nervous and hygienic circumstances in the patient's life and living rather than in attempting to search blindly for a suitable dietary. Idiosyncrasies are almost as numerous as patients, and in this respect the individual must rely on his own investigation.

# The Oral Treatment of Diabetes Mellitus: an explanation of the Synthalin System

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INSULIN, a great advance in the treatment of diabetes mellitus, has many drawbacks in practice; no system of treatment which involves strictly timed injections twice daily is likely to be popular. In hospital it is difficult to carry out, in the homes of the masses of the people it cannot often be carried out at all. Any system of treatment even approaching in value that of insulin, but not entailing injection, should be welcome. The present paper describes such a system and we claim that it gives equally good results as does insulin, if properly carried out.

It has been known for some time that guanidin markedly reduced the level of sugar in the blood. Frank<sup>2</sup> investigated this action and by modifying the guanidin nucleus, he produced a compound which was devoid of the other toxic actions of guanidin. He called this compound synthalin, and claimed that it had properties similar to those of insulin, but that it was effective by oral administration. It happened that one of us (A. T. T) was asked to advise on the treatment of an insulin resistant case just after Frank's

paper appeared. This was a severe late case of diabetes with advanced phthisis; she was tortured by pruritus vulvæ and by thirst. Insulin rather increased her troubles, for each injection either produced an abscess or a painful induration. Synthalin was administered with happy effects. From that time, i.e. 1927, synthalin has been continuously used in the Bristol Royal Infirmary diabetic clinic directed by one of us (A. T. T.). Soon after its introduction, the Medical Research Council, wisely or not, forbade the sale of synthalin, pending investigation. Several centres, this clinic being one, were asked to test it and report upon the findings. With the exception of this centre, the reports were adverse; synthalin was condemned as not only useless, but actually dangerous. Since then few writers on the subject have failed to enlarge on the danger of synthalin medication. Yet on the Continent and in this clinic synthalin has been continuously and increasingly in use. It can now be said to be effective, if given correctly, and so devoid of danger that we have cases which have been on synthalin for four years, with excellent results. The system which follows is in no way a copy of Continental methods; a regime has been gradually perfected. Four years ago we could only treat about 25 per cent of diabetics with synthalin; now we are able to treat about 70 per cent.

It may well be asked why this clinic was unique in finding synthalin useful; the reason is probably simple. At that time most English clinics were dieting diabetics on the system elaborated chiefly by Allen; this consisted in the minimum of carbohydrate and calories with gradual increase. This system was never in use at this clinic; from the time when insulin was introduced a diet relatively rich in carbohydrate and caloric enough to permit the usual work was given on diagnosis, and then insulin, later synthalin, was administered. If a diabetic is put on a diet poor in carbohydrate synthalin will be hurtful—the reason will

appear below. Also synthalin is never given unguarded.

#### MODE OF ACTION OF SYNTHALIN

If we knew how insulin acted, we should be in a better position to understand synthalin. Frank claimed that synthalin acted like insulin, inasmuch as it reduced hyperglycæmia and enabled glucose to be utilized, as evidenced by the rise of the R Q. and the drop in the arterio-venous glucose level, and his claims have been substantiated.<sup>5</sup> It is not known how insulin and synthalin effect this

Shortly before the isolation of insulin, diabetes mellitus was regarded simply as hypo- or an-insulism, and analogous to hypo- or a-thyroidism. It was considered that, owing to some known and more unknown causes, the islet cells failed to elaborate insulin, a substance necessary for the utilization of glucose. We now know that this theory is not correct, for completely depancreatized dogs cannot be kept alive indefinitely on insulin alone<sup>6</sup>; also, as a rule, there are no structural changes in the islets; and, finally, that in the pancreas of patients dying of diabetic coma, insulin is present.<sup>12, 13</sup> This latter finding might suggest that the tissues of the diabetic had a greater need for insulin than his pancreas was able to secrete, i.e. that the cell threshold for insulin was raised, requiring an addition by parenteral injection. On this supposition synthalin might act by lowering this threshold and thereby enable the endogenous insulin to be used.

Before the postulation of insulin, diabetes was considered to be brought about either by alteration of the metabolism of the pancreas or the liver—omitting the traumatic and operative varieties. It was debated whether diabetes was pancreatic or hepatic. Insulin caused a swing over to the pancreas, but a recoil is about due. Much might be written on the relationship of the liver to diabetes; the occurrence of glycosuria in liver disease, especially cirrhosis, the frequency of

gall-bladder and bile-duct disease in diabetes; the diabetes of hæmochromatosis are significant clinically. Mann's<sup>15</sup> finding of diminished glycaemia after excision of the liver may be taken as evidence of a synergy between liver and pancreas, for removal of either viscus is followed by the opposite glycaemic result. Then increase of thyroid secretion, either in experiment or disease, by stimulation of the liver, causes hyperglycaemia, and even glycosuria; the reverse thyroid change causes the opposite, or increased sugar tolerance. As will be noted below, bile salts tend to reduce glycaemia,<sup>3</sup> this change being more marked when thyroid secretion is increased, and not following after thyroidectomy. Several observers have stated that the height of the glycaemic level is inversely proportional to the amount of glycogen in the liver, and the amount of hepatic glycogen is usually considered as a criterion of the activity of the liver. The findings of Chabanier<sup>10</sup> and his colleagues is especially instructive in this respect: Healthy adults starved of carbohydrate for three days show increase of glycaemia and even diabetic curves. Diabetics allowed abundant carbohydrate for the same period, show reduction of the hyperglycaemia. Normals on ordinary diet given 50 gms. of glucose plus 15 units of insulin show trivial diminution of the glycaemia only, but if given this after three days of carbohydrate starvation they experience hypoglycaemic shock.

It may be justifiably concluded that insulin acts by one of two, or by both properties. (1) that insulin is a catalase which causes a certain alteration of the glucose molecule which enables the changed molecule to be utilized; (2) that in certain concentrations insulin acts by depressing hepatic over-action as regards glycogenolysis, and all that this entails. Against the first being the only action of insulin, we bring forward the occurrence of the insulin resistant cases, the finding of insulin in the tissues of diabetics not treated by exo-

genous insulin, and the results of synthalin treatment

Diabetes is assumed to be due to the loss of restraining power of insulin on the hepatic cell. This lack of restraint may be occasioned either by the liver of the diabetic requiring more insulin than normally, or to actual diminution of insulin secretion. Such lack of restraint on glycogenolysis may be sufficient to explain both basal features of diabetes—the hyperglycæmia and the failure to utilize glucose. Increase of glycogenolysis entails hyperglycæmia, which diminishes endogenous insulin production. This was the basis of the pre-insulin treatment of diabetes, and was founded on the findings of Allen, who noted that when the glycæmic level attained that of diabetes, the special secretory granule, considered to be the precursor of insulin, disappeared; but if the glycæmia were lowered, the secretory granule reappeared. It follows that simple absence of inhibition of hepatic glycogenolysis leads to hyperglycæmia, glycosuria, thirst, polyuria, wasting, asthenia, inhibition of endogenous insulin secretion with resulting inability to utilize glucose; that is, the vicious circle of diabetes. This theory is given as a working hypothesis to explain the action of synthalin.

Synthalin is most definitely a hepatic depressant; this is readily observed clinically and has been confirmed experimentally<sup>1,4</sup>. The so-called toxic symptoms of synthalin are those of hepatic depression and are similar to the symptoms produced by other depressants; if injudiciously continued it will lead to jaundice and even liver atrophy. Synthalin, then, is regarded simply as depressing hepatic activity, more especially as regards glycogenolysis, with this increase of hepatic restraint due to synthalin, the endogenous insulin of the diabetic is adequate to enable carbohydrate utilization. This theory brings the action of synthalin and insulin into line, and is in harmony with our present knowledge. For insulin is an enzyme which



causes glucose to be converted to a compound, probably glucosone, which can be utilized. Synthalin is not an enzyme and cannot alter glucose, yet glucose utilization is obvious when synthalin is correctly administered. It follows that synthalin must exert its action either by lowering the cellular threshold for glucose-insulin metabolism, or, more probably, it acts by depressing glycogenolysis, thereby increasing the secretion of endogenous insulin.

#### THE ADJUNCTS TO SYNTHALIN MEDICATION

*Bile salts.*—It was noted that synthalin is never given unguarded. Its introduction into therapeutics was shortly followed by papers which attributed the toxic symptoms to hepatic intoxication. Adler<sup>1</sup> reported that urobilin increased and that jaundice might follow; he concluded that this might be due largely to embarrassment of bile secretion, and advised that chologogues should be administered concurrently, and especially salts of de-hydrocholic acid. The advice was good, but was probably based on a faulty deduction, for Hornung<sup>4</sup> reported that the bile content of the gall-bladder was increased. Since then it has been learned that bile salts act, as Hornung's observation would show, by stimulating hepatic metabolism, and also tend to diminish hyperglycæmia.<sup>3</sup>

*Pancreas*—As sweetbreads, or as extract, pancreas has had a vogue in the treatment of diabetes, and there could be little doubt from the work of Scott and others<sup>11</sup> that it has some action. This belief was strengthened when Macleod<sup>6</sup> reported that oral pancreas was necessary for the survival of completely depancreatized dogs. The patients are advised to take sweetbreads once or twice weekly.

*Liver.*—The action of liver is not so clear. Blotner and Murphy<sup>14</sup> reported that liver diet has some action in depressing hyperglycæmia. Later observers have not substantiated this finding. However, since hepatic

opotherapy has a place in the treatment of hepatic subfunction, especially cirrhosis, it may well be that liver, like bile salts, may have an action in restraining the depressant property of synthalin on other functions than that of glycogenolysis. Moreover, liver is quite a good form of protein. The patients are advised to replace the meat ration of one day each week with liver. The liver is given cooked, for cooking does not diminish its hæmatinic power.

*Phosphates*—A negative phosphate balance is a feature of diabetes. When Meyerhof published his theory of the resynthesis of glycogen from glucose, such phosphate loss became more readily explicable; he post-postulated a hexose-phosphate stage. In diabetes glycogen is diminished or absent; resynthesis does not appear to occur, and phosphate would not be wanted. This stage in the synthesis of glycogen is not generally accepted, but even if it does not occur, phosphate loss would be expected in a wasting illness. A phosphate tonic mixture is given daily in order that abundant phosphate shall be available, and to act as a mild saline laxative.

*Vitamin B*—Some favourable results of ingesting substances rich in this vitamin have been published. Its action in depressing glycaemia have not been substantiated, but it has been found that vitamin B appears to assist the absorption of glucose from the alimentary tract,<sup>7</sup> and that it also tends to augment the amount of hepatic glycogen.<sup>9</sup> As it also has a laxative action, it should be of use in the synthalin treatment.

#### THE REGIME OF SYNTHALIN TREATMENT

*Diet*—The diet is calculated on the basal requirement of the patient, following Dreyer's well-known tables. Twice the basal amount is given for light, and thrice for medium-heavy work. Carbohydrate is allowed fairly liberally; the ration of fat to carbo-

hydrate in grammes in the four stock diets is as follows ·  
F/C :: 107 : 180, 137 : 186, 165 · 220, 170 : 238

Carbohydrate is given as bread, oatmeal, potato and other vegetables. The items of the various meals may be altered *ad libitum*, for there is no risk of hypoglycæmia. The patient is given beta-synthalin (Scher-  
ing, London), decholin (Medical Laboratories, Ltd., London), or one of the cheaper preparations of dehydrocholic acid (May and Baker, London).

Phosphate mixture · this consists of :—

R	Sod acid phosphat	-	-	-	-	gr	℥	℥
	Tinct nucis vom	-	-	-	-	℥	viii	
	Spt vini rect	-	-	-	-	℥	xxv	
	Inf gent co ad	-	-	-	-	℥	3i	

This mixture is taken t d s. For an adult patient start with 10 mgs or two pellets of beta-synthalin, morning and evening after meals. With every two pellets of synthalin give one tablet of decholin. This is continued for two days, on the third day no synthalin is given, to prevent cumulation. The phosphate mixture is not stopped on the day of rest. The urine should be tested daily for qualitative sugar, specific gravity and diacetic acid.

Synthalin is slow in action and probably no urinary change will be noted for ten days, but the patient often feels some relief before urine changes are noted. If there is euphoria but no urinary change, increase the synthalin by two pellets daily every five days or so, until either intolerance or diminution of the glycosuria and ketosis is observed. Even in the most satisfactory cases, traces of sugar will be noted in the urine every now and then. With each increase of two pellets of synthalin add one tablet of decholin. When good clinical and urinary results have been present for some weeks, it is well to attempt to diminish the synthalin by one pellet daily until the dose which stabilizes euphoria with a sugar-free urine is found. The bile salt preparation is diminished *pro rata*. Laver replaces

the meat ration of one day. Sweetbreads replace half the meat ration of another day. A heaped dessert-spoon of bemax, or a teaspoonful of marmite is taken once daily. Blood-sugar curves are not essential, but are of use in the later stages, for as the curve approaches normality, the synthalin may be still further reduced.

Transfer from insulin to synthalin is usually easy in a case of slight or moderate severity, especially in elderly subjects. So long as insulin is being used the patient is allowed no liberty in altering the make-up of the meals preceded by insulin. For a 30- to 40-unit case, diminish the insulin by half, and institute synthalin as noted above. When urine is sugar-free, reduce insulin again by half, increasing the synthalin, if necessary. Thus gradually cut out insulin. There is little or no risk in transferring a patient backwards and forwards from insulin to synthalin in this manner.

Diabetic coma should not be treated with synthalin, as it is much too slow in becoming effective. Severe cases of diabetes, especially in young subjects, are better treated with insulin at first, but when stabilized a cautious attempt to wean on to synthalin may be made. As the clinician learns how to manage synthalin, he will find that he can successfully treat even severe cases in the stage of pre-coma. We have had several cases with high glycaemia, much ketosis and pronounced abdominal pain improve on synthalin; the dosage was more rapidly pushed up to 80 or 100 mgs daily. Incipient gangrene should be treated with insulin until satisfactory progress warrants a trial of synthalin. We estimate that any practitioner will be able to treat 50 per cent. of his diabetics by this method at the outset, and that increasing experience will raise the percentage.

#### INTOLERANCE TO SYNTHALIN

It has been noted that intolerance will not often be found provided a high carbohydrate and a low fat

diet is given. The symptoms are vague dyspepsia; feeling of weight in the upper abdomen; increase of flatulence and feeling of distension; either constipation, or more often variable constipation with colicky looseness; loss of appetite; loss of weight; general malaise and languor.

If such symptoms are experienced it is well first to try whether increase of carbohydrate and diminution of fat, and increase of bile salt does not give relief. A two-day rest period is worth trying. But if such symptoms persist and recur more markedly each time synthalin is restarted, it will be foolish to continue; transfer to insulin, but give synthalin a trial again later.

#### ILLUSTRATIVE CASES

It would be a waste of space to describe anything like all the cases we have treated. A few average cases should suffice.

*Case 1* —A female, aged 69. Started insulin treatment in 1927, 20 units daily with 1800 calorie diet. Started synthalin May, 1930, 20 mgs daily. Has gained 8 lbs in weight. No nycturia now. No polyphagia now. Was glycosuric on insulin (not given by this clinic), has been sugar free for 5 months. Was unable to work, can work now.

Glycæmia	5/5/30	16/3/31	1/10/31
Stat - - -	0 327	0 137	0 224
60 minutes - -	0 388	0 230	0 280
90 " - - -	0 432	0 252	0 344
120 " - - -	—	0 183	0 339
180 " - - -	—	0 200	0 298

Diet now increased to 2650 calories

Note that in spite of the late rise in glycæmia she is still sugar free

*Case 2* —A male, aged 45. Since April, 1928, he has been on 1680 calorie diet and 30 units insulin. He has been repeatedly started on synthalin, but has never been able to continue. He felt definitely, but vaguely ill. A synthalin resistant case, if it were continued liver atrophy would probably follow.

*Case 3* —A male, aged 21. Treatment started in January, 1931. Diet 2300 calories. Synthalin 30 mgs daily. Weight unaltered. Polyuria improved to normal. Hunger now not abnormal. Urine

was loaded, now steadily sugar free Is able to do his usual work

Glycæmia	3/2/31	3/6/31.
Stat . . .	0 123	—
60 minutes . . .	0 229	0 124
90 " . . .	0 219	0 089
120 " . . .	0 200	0 079
180 " . . .	0 162	0 075

He is quite well, and diet is increased to 2650 calories

*Case 4*—A female, aged 44 A diabetic acute abdomen in 1929, Mr Rendle Short treated by insulin and not by operation Insulin continued until 17/3/30 when 20 mgs synthalin and 1680 calorie diet started Weight has slightly increased to 12 stones 10 pounds Polyuria now normal Polyphagia much less Urine sugar free Was unable to work on insulin, has now returned to work as tailoress

Glycæmia	1/8/29	18/11/30
Stat . . .	0 141	0 091
60 minutes . . .	0 253	0 147
90 " . . .	0 246	—
120 " . . .	0 224	0 141
180 " . . .	0 168	0 113

This case has done much better on synthalin than she did on insulin

*Case 5*—A male, aged 66 Treated on insulin from 1924 until 1928, when synthalin was started This man has been on synthalin for more than three years Has 30 mgs daily Diet increased to 2650 calories Has lost some weight, but was a fat diabetic Polyuria by day still present, but now has no nycturia Urine was loaded, is now sugar free Asthenia was marked, now he can do light work The original sugar curves cannot be found

Glycæmia	1/6/30	20/10/31
Stat . . .	0 131	0 224
60 minutes . . .	0 192	0 266
90 " . . .	0 161	0 259
120 " . . .	0 153	0 253
180 " . . .	0 115	0 217

Is better on synthalin than on insulin administered by a consulting physician Though the glycæmia is now at diabetic level, he is still sugar free

*Case 6*—A male, aged 69 Attended first in July, 1931, and was put on 2560 calorie diet with synthalin 20 mgs daily Has gained a few pounds in weight Micturition much less frequent Hunger much less Urine now sugar free Was too ill to work, is now able to do light work

Glycæmia	11/8/31	29/9/31
Stat . . .	0 173	0 125
60 minutes . . .	0 259	0 186
90 " . . .	0 263	0 190
120 " . . .	0 227	0 160
180 " . . .	0 192	0 129

Synthalin is now reduced to 10 mgs daily

*Case 7*—A male, aged 61 Since 1924 on 2100 calorie diet and 30 units insulin Attended this clinic in June, 1931, and was started on synthalin 30 mgs with 2650 calorie diet Weight unaltered, normal Polyuria now normal Polyphagia much less Urine sugar free for 3 months to date Was unable to work, can now do light work

Glycæmia	22/6/31	29/9/31
Stat - - -	0 180	0·105
60 minutes - -	0 259	0 150
90 „ - -	0 250	0 151
120 „ - -	0·227	0 137
180 „ - -	0 194	0 114

Again this man has done much better on synthalin than he did on insulin administered by a consulting physician

### CONCLUSIONS

A system of treatment of diabetes without injection is described, and a working hypothesis of the mode of action is presented. It is demonstrated that synthalin is a perfectly safe treatment if it is sensibly administered. It is demonstrated also that this system of treatment gives as good results as insulin in about 70 per cent. of diabetics, but with much less trouble to the patient. The system is easy to carry out, it needs little supervision, and it costs about the same as insulin treatment.

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# Chronic Coli-bacillæmia and its Manifold Consequences

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COLI-BACILLURIA until recent times has been in great measure overlooked abroad, but has always impressed British practitioners as of considerable importance, being a sign of actual infection by the *Bacillus coli*, though in most instances the tendency has been to look upon it as a local infection limited to the urinary apparatus and, as a rule, acquired *via* the urethra. As a matter of fact, ascending infection is quite exceptional, otherwise suppuration of the glands communicating with an infected cavity would be of daily occurrence. The *Bacillus coli* met with in the urine has almost always been conveyed by the blood, and coli-bacilluria is usually the consequence of coli-bacillæmia of intestinal origin. But, far from being merely an intermediate phase, a link in the intestino-urinary chain of disturbances, coli-bacillæmia constitutes a true morbid entity. Its effects are not limited to common infections of the kidney and bladder, but are liable to affect the organism as a whole in such a way that its effects in hepatic pathology are in no way inferior to those in the urinary domain, and it is the generally overlooked cause of a whole series of disturbances. This is the view that I have been successful in getting adopted in France and which I now desire to bring before the British medical profession.

## THE PRINCIPAL CHARACTERISTICS OF CHRONIC COLI-BACILLÆMIA

The *Bacillus coli* dwells in the intestine as a normally



cystitis.

### CONSEQUENCES OF COLI-BACILLOSIS

These are very numerous and varied, and practically almost every organ may become involved.

*Urinary consequences.*—The *Bacillus coli* may pass through the kidney without causing any damage to the urinary apparatus, entailing merely more or less latent coli-bacilluria. In other cases it causes infection of both kidney and bladder. This is the usual pathology of pyelitis and cystitis, which represent the most anciently known of the lesions set up by the *Bacillus coli*. Hæmaturia, urethritis, and a variety of albuminuria may be due to this organism. The two first are rare and when they do occur their cause is often overlooked. Coli-bacillary albuminuria, on the other hand, is of extremely frequent occurrence, it is usually slight, indeed it may barely be perceptible. I have often seen it associated with a small increase of urea in the blood, but rarely is there any puffiness of the face. In opposition to a widely received view, I have never seen it run on to grave nephritis. It is often intermittent, and milk, so injurious in intestinal infection, tends to aggravate this state.

Coli-bacillosis plays a highly important part in the causation of oxalaemia and oxaluria. In opposition to what we might be tempted to suppose, it seems to have very little influence in determining the formation of phosphatic calculi in the kidney, these being due mostly to the staphylococcus.

*Effects on the liver and gall-bladder.*—These are by no means inferior in importance and interest to the urinary manifestations, nor need this excite surprise, seeing that the germs which have found their way into the blood-stream are eliminated by the liver fully as much as by the kidneys. Coli-bacillosis rarely causes jaundice or cholangitis; for their production there would be required a more virulent micro-organism than this

quasi-saprophyte recently derived from the intestine, for instance, a micro-organism that has had its virulence exalted in some local lesion. On the other hand, frequent terminations are chronic congestion of the liver and chronic cholecystitis with or without calculi.

Certain men and many women with enlarged livers are subject more or less to attacks of pain, and this without any dietetic irregularity or undue indulgence in alcohol. When we examine their urine, preferably during one of these attacks of pain, we almost always find the *Bacillus coli*.

Coli-bacillosis certainly plays a prominent part in the causation of cholelithiasis. For the last ten years I have insisted on this point<sup>1</sup> and I have brought forward a telling argument in support of my thesis, namely, that as far back as 1924 I showed<sup>2</sup> that chronic coli-bacillæmia gives rise to hypercholesterolæmia. I calculated the amount of cholesterol in the blood of 64 patients with coli-bacillæmia 11 men and 53 women, selected from among those who had never presented any sign of lithiasis and who were not suffering from any of the diseases that are reputed to be hypercholesterologenic, such as gout, diabetes, and nephritis. These 64 patients showed an average of 2.25. In a further series of 52 recent cases, 8 men and 44 women, I obtained an average of 2.17. Curiously enough, Lord Moynihan,<sup>3</sup> in a series of 101 patients suffering from cholelithiasis, obtained exactly the same figure, 2.17. This is a fact of considerable importance and is calculated to throw fresh light on the much-debated question of the origin of gall-stones. It would appear to be not the hypercholesterolæmia that determines the cholelithiasis but, in most instances, the bacteriæmia of intestinal origin which, on the one hand, causes an increase of cholesterol in the blood, and, on the other, by the attendant infection of the bile gives rise to lithogenic catarrh and irritation of the mucous lining

of the gall-bladder.

Whatever be the precise mechanism of the formation of gall-stones, two facts are obvious: on following up for a sufficient length of time patients who have colibacilluria we find that, in a very impressive proportion, after a few months they develop tenderness of the gall-bladder, and some years later have attacks of hepatic colic. When, on the other hand, we look for colibacilluria in sufferers from gall-stones we find that in most of them it is present or has been present. The same remark applies to non-calculous cholecystitis, and this explains how it is that the latter disease is associated with hypercholesterolaemia fully as frequently as is cholelithiasis. The cyclical vomiting of childhood, with or without acetonaemia, which is usually attributed to the liver, not unfrequently coincides with the discharge of colon-bacilli in the urine.

*Effects on the nervous system.*—Coli-bacillosis is often the cause of a whole series of manifestations called "nervous," such as asthenia, a proneness to fatigue, a tendency to mental depression, cerebral lethargy, irritability, nervousness, uncertain temper, and even insomnia. It often leads to neurasthenia in subjects predisposed thereto. These patients are often unrecognized victims of the *Bacillus coli* and constitute the innumerable chronics with their variable and ill-defined disturbances. Their health is not seriously affected, but they are for ever complaining of this, that or the other, one day well, the next intensely depressed. Since we are unable to trace to any particular disease the thousand and one ills they complain of, we dub them "nervous" and lend an unwilling ear to their lamentations. Yet they are entitled to complain and their sufferings are by no means imaginary or mysterious in the eyes of those familiar with coli-bacillosis.

*Effects on the circulatory system.*—A lowering of the blood-pressure, which may be very pronounced, usually

accompanied by peripheral circulatory disturbances, such as cold feet, numb hands, tingling in the extremities and the sensation of "dead finger," is common in coli-bacillosis which, in opposition to the statements of certain observers, does not appear to predispose to arteriosclerosis. Phlebitis, supervening in a vein, varicose or not, independently of any other infection is, in most cases, due to the *Bacillus coli*.

*Effects on the endocrine glands and the vegetative nervous system*—These have been very inadequately worked out, but I maintain that they are extremely important. The ovary and the testicle may be involved; menstrual disturbances are frequent and impotency sometimes supervenes in connection with coli-bacillary infection. But it is particularly the thyroid and the suprarenal glands that are most frequently attacked. Several of my patients had painful swelling of the thyroid at each outburst of coli-bacilluria, and many of them suffered chronically from symptoms usually ascribed to Graves' disease. Asthenia and hypotension, as a rule so marked in the subjects of coli-bacillosis, may well be due to involvement of the suprarenal glands. When the existence of coli-bacillosis is overlooked, the diagnosis is often that of irregular glandular action and sympathetic disturbances. In such case organotherapy and intestinal disinfectants prove equally beneficial. This points to the co-existence of coli-bacillosis and glandular insufficiency, but I feel convinced that, except in congenital cases, infection nearly always precedes and commands the secretory disturbance.

*Effects on the genital system*—The *Bacillus coli* circulating in the blood may "stay off" in the testicle, giving rise to orchitis, though this is rare; it may fix itself in the Fallopian tube and set up salpingitis, but this, too, is exceptional, as shown by the rarity of the affection in girls who are, however, often the subjects of coli-bacillosis. This infection, nevertheless, does often attack the genital tract of women, but by a somewhat

different mechanism. The germs conveyed by the urine, proliferating *in loco* may cause inflammation of the vulva and, gradually spreading, give rise to vaginitis and metritis. The vulvitis and leucorrhœa seen in girls and the leucorrhœa of adult women appear pretty frequently to originate in this way.

*Certain other important effects of coli-bacillosis* — There is such a thing as fever due to coli-bacillosis. It may, especially in the child, cause a fugitive rise to  $102.5^{\circ}$  F. or  $103.5^{\circ}$  F. In most instances it is slight, oscillating round about  $100^{\circ}$  F., unaccompanied by any discomfort beyond a slight feeling of lassitude. Its salient features are its persistence and its innocuousness. We have all come across patients whose temperatures have been above normal for weeks or months or even years without any particular depreciation of their standard of health. The rise is attributed to various causes, but in most instances it is due to coli-bacillæmia. Constant headache and megrim are, far oftener than is recognized, the consequence of coli-bacillary infection—certainly in upwards of half the cases.

Coli-bacillosis but rarely gives rise to chronic rheumatism, but on the other hand it would appear to be a frequent cause of fibrositis, painful stiffness and creaking of the neck. Coli-bacillary lumbago, mild as a rule, may become very troublesome and dominate the clinical picture. It presents one peculiarity which seems to be fairly constant and has often enabled me to identify it, namely, it is aggravated by lying down and is therefore much more pronounced in the morning.

#### CLINICAL PICTURE OF COLI-BACILLOSIS

These, then, are the principal of the numerous manifestations of coli-bacillosis. According as one or other predominates the disease assumes a different aspect, but while some of these manifestations are

exceptional, others are fairly constant, giving its typical aspect to the affection. These usual symptoms of coli-bacillosis may be divided into four groups: intestinal, urinary, hepatic and nervous or constitutional.

*Intestinal symptoms.*—Constipation or diarrhœa or alternately one and the other, cœcal splashing, tenderness of the retracted or thickened colon, fœtid motions, coated tongue and offensive breath.

*Urinary symptoms.*—Turbid, opalescent urine with a disagreeable odour, dysuria, frequent micturition and—a quasi-pathognomonic sign—coli-bacilluria.

*Hepatic symptoms.*—Tenderness of the liver and more particularly of the gall-bladder, hypercholesterolæmia, a bitter taste in the mouth, regurgitation of bile, nausea, chronic cholecystitis with or without gall-stone.

*Nervous or constitutional symptoms.*—Lassitude, asthenia, depression, melancholia, irritability, nervousness, sensitiveness to cold, a tendency to develop a temperature above normal, headache and megrim.

The intestinal symptoms depend less upon the coli-bacillæmia than upon the changes in the intestinal walls that have allowed the passage of the germs into the blood current, but by virtue of their quasi-constancy they help to confer upon coli-bacillosis its special cachet and are entitled to a foremost place in its symptomatology. It is hardly necessary to remark that coli-bacillosis never presents itself with *all* of the symptoms enumerated above. One or other of the groups, indeed, may be altogether lacking, though this is rather exceptional; indeed, the four classes of symptoms are nearly always represented, or have been at some time or another, though possibly so unostentatiously in respect of one or the other that they must be looked for to be recognized. Very frequently, on the other hand, an isolated symptom or group of symptoms will predominate, so much so as to concentrate the practitioner's attention thereon and so pass

different mechanism. The germs conveyed by the urine, proliferating *in loco* may cause inflammation of the vulva and, gradually spreading, give rise to vaginitis and metritis. The vulvitis and leucorrhœa seen in girls and the leucorrhœa of adult women appear pretty frequently to originate in this way.

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#### CLINICAL PICTURE OF COLI-BACILLOSIS

These, then, are the principal of the numerous manifestations of coli-bacillosis. According as one or other predominates the disease assumes a different aspect, but while some of these manifestations are

to run the risk of gross mistakes which would bring discredit upon views capable of explaining whole series of cases met with in daily practice—cases which would be difficult to account for on the ordinary data. Speaking generally, colibacillosis should be recognized promptly and with certainty by any experienced practitioner, so characteristic are its manifestations. It is only fair to mention that one other intestinal germ—the *Enterococcus*—is also known to find its way into the circulation, being eliminated by way of the urine, giving rise to the same disturbances as the *Bacillus coli*, but it is met with much less frequently in this connection.

#### PROGNOSIS IN COLI-BACILLOSIS

Chronic coli-bacillosis is generally looked upon as a disease which is more troublesome than serious. By reason of its refractoriness, the ease with which it recurs, and the multiplicity of the disturbances to which it gives rise, I feel justified in asserting that it is, on the contrary, a formidable disease. It is serious because it plays a foremost part in the causation of affections as difficult to cure as pyelitis and chronic cystitis, and as painful and subject to complications as cholecystitis and cholelithiasis. It is serious because of its oftentimes disastrous effects on the general health and the nervous system, so that although it may not directly threaten life it is apt to render it miserable

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# Observations on Perforated Gastric and Duodenal Ulcers

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**T**HIS article is a summary of observations made with the object of testing the reaction of the fluid escaping into the peritoneal cavity through perforated gastric and duodenal ulcers. The procedure adopted was as follows:—

The abdomen was opened and a small mop, held in an artery forceps, was dipped in the intra-peritoneal fluid. This was handed to the Registrar for immediate testing with litmus paper. The free fluid was then removed by suction or mopping. Fluid was then squeezed out through the perforation on to another mop and tested. If no fluid could be squeezed out, the tip of an artery forceps was inserted through the perforation and rubbed against the mucous membrane of the stomach or duodenum, and the film of fluid on it examined. During the suturing of the ulcer it was observed that the inflamed peritoneum secreted a moderate amount of fluid. This also was tested.

During the last eighteen months sixteen cases were investigated, of which seven were gastric, eight duodenal and one with a perforation on each side of the pylorus. In every case the free fluid in the peritoneal cavity was alkaline, including the pool of fluid actually lying over the gastric perforation. The fluid squeezed out of the gastric perforation was acid in every case, but in the duodenal, six were alkaline and two neutral. The double perforation was interesting, as the fluid was acid in the gastric, but alkaline in the duodenal perforation. The fluid secreted by the peritoneum during the operations was alkaline.

*Comments.*—It is assumed by most surgeons that a reflex contraction of the pyloric sphincter is produced as a result of irritation of the peritoneum by the fluid escaping through a perforation in the stomach or

duodenum. The above findings seem to confirm this, and the absence of hydrochloric acid in the fluid escaping from a duodenal perforation is explained. This reflex is an advantage in duodenal perforations, as the irritating acid contents of the stomach are prevented from escaping into the peritoneal cavity. In gastric perforations it has the reverse effect.

Some of the gastric cases were operated upon within four hours of perforating, but at operation the free fluid in the peritoneal cavity was alkaline. This result could only be obtained by the secretion of an alkaline fluid by the peritoneum. When the amount of gastric juice in the stomach is considerable and highly acid, a corresponding drain of alkaline salts must take place from the blood and tissues generally. This may be one of the reasons why a perforated gastric ulcer has a higher mortality rate than a duodenal, as in the latter there is no acid fluid to be neutralized by the peritoneal secretion. Professor D. P. D. Wilkie, of Edinburgh, has shown<sup>1</sup> that, in intestinal obstruction, the abstraction of salts from the blood plays a prominent part in producing fatal collapse in this condition. It has already been stated that in gastric perforations alkaline fluid continues to be secreted by the peritoneum after the operation is completed, but that the fluid is afterwards absorbed. It is well known that draining the abdomen after operation raises the mortality rate, and it is reasonable to suppose that the continued loss of the alkaline peritoneal secretion through the drainage tube may be responsible for this.

Other factors influencing the results obtained by operation on these cases are dealt with in an article previously published<sup>2</sup> and in the Clinical Records of the Cardiff Royal Infirmary of 1926-7-8.

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# Case Report

## Double Acute Mastoiditis with Bacteriæmia: Operation and Treatment Internally with Disulphamin.

By CHARLES H CARROLL, M.R.C.S., L.R.C.P., D.L.O.

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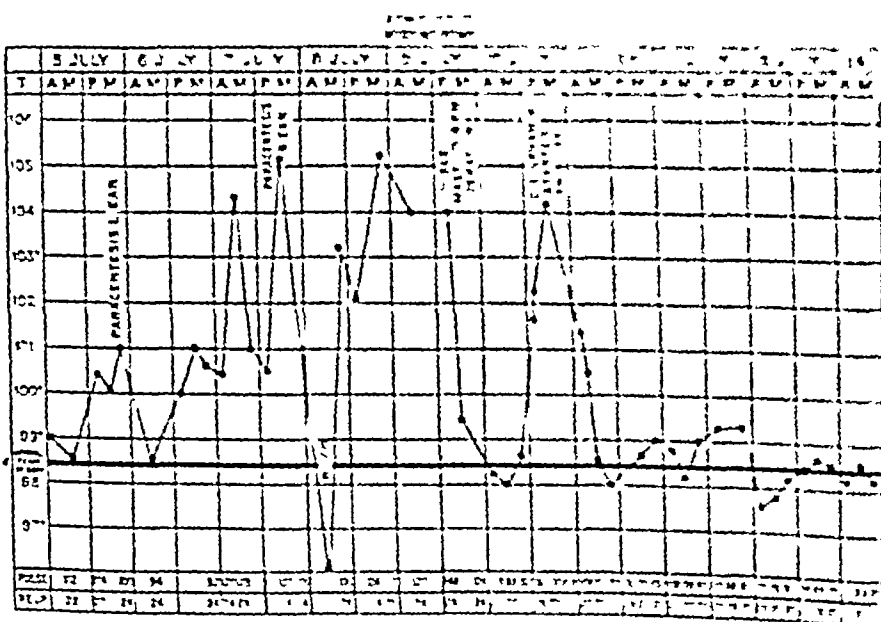
**T**HERE are certain points regarding the following case which would seem to make it worthy of being published:—

On July 7, 1931, I was asked to see in the country, a girl, J. C., aged 11 years. She had a history of recent measles, which left her with a slight bronchitis and an irregular temperature. On July 5th she developed acute pain in the left ear and her practitioner on being sent for found the left membrane bulging and performed a paracentesis, with relief to the patient. Two days later acute pain in the right ear supervened and at 9 p.m. I performed a paracentesis on the right ear, its membrane presenting signs of acute purulent otitis media. A small amount of pus under pressure was released. Her temperature at the time of operation was 105° F, the pulse-rate 140. The left ear was discharging profusely, the throat clear. On July 8th her temperature was 103.2° F at 10 a.m. and 105° F at 10 p.m., but a rigor occurred during the day. On July 9th I was asked to go and see her again. I found her looking very ill, with definite tenderness over both mastoids, the ears had ceased draining and her temperature was 104° F. I advised immediate operation and she was brought in 20 miles by ambulance to a nursing home, where I performed a double Schwartzes mastoid operation at 4 p.m. Pus was found in both mastoid antra and mastoid cells towards the tips of both processes. The lateral sinuses were not exposed as her condition (temperature 104° F, pulse-rate 146, with a catarrhal condition of the chest) was against too extensive surgical interference. Both wounds were closed at their upper ends with drainage tubes inserted. At 9 p.m. on the same day her temperature was 99° F, with profuse perspiration and general condition good.

On July 10th the temperature gradually rose from 98° F in the morning to 104° F at night. All stitches were taken out and she was put on disulphamin capsules, two every 3 hours. On July 11th there were definite crepitations and dullness over both bases of the lungs, otherwise her condition good. Antiphlogistine was applied to the bases of lungs, and in 3 days the chest was clear. From the time of starting her on disulphamin she never looked back and on August 1st she was sent home well, with both ears healed and dry.

and looking extraordinarily well

This small girl must have had an otitic bacteræmia in the early stages of her illness as evidenced by her swinging temperature and high pulse-rate. She had one definite rigor which also pointed to a blood-borne



infection. It is the first occasion that I have used disulphamin, a preparation given orally and which is apparently widely used in America for septicæmia. I used it for a fortnight in this case with very happy results, and I think it well worth a trial in similar cases.

# Practical Notes

## *Effect of Adrenaline on Intra-Ocular Pressure.*

W S Duke-Elder, P M Duke-Elder and J C Colle publish a report of experiments on the effect of adrenaline on the intra-ocular pressure and its clinical significance. It appears, as judged from pressure records in the intact animal and the artificially perfused eye, from the change of blood-flow as recorded by temperature changes, and from the direct observation of the intra-ocular vessels, that the action of adrenaline upon the eye itself uncomplicated by the effects of the general circulation is four-fold: first, in small doses it dilates the capillaries and raises the intra-ocular pressure, second, in large doses it constricts the arterioles and capillaries and lowers the pressure, third, in any dose it constricts the plain muscle of the orbit and raises the pressure, and fourth, it dilates the pupil, an action which appears to be without any significant influence on the intra-ocular pressure, since it may be associated with either a rise or a fall. In the intact animal, where the situation is complicated by general vascular changes, the raised blood pressure tends to break through any arteriolar resistance which may be present and causes a rise in the intra-ocular pressure unless (with individual variations) the dosage is very high, when by local constriction of the arterioles may be sufficient to counterbalance this. In man the action of Müller's muscle in raising the intra-ocular pressure will be very much less than in the dog, owing to its very small development in the former, it is probable indeed that it may be neglected altogether. Apart from this, the present investigation accounts for the variability of the action of adrenaline upon the pressure of the eye. Depending upon the dose in which it becomes effective in the eye it will either dilate the minute vessels, raising the pressure, or constrict them, tending to lower the pressure, and the possibility of the constriction becoming effective will depend upon the extent to which the drug is absorbed into the general circulation. The fact that the vessels of the eye react less markedly than those of large areas elsewhere in the body (particularly in the skin, and upon the heart itself) makes ocular changes subservient to general changes — (*British Journal of Ophthalmology*, February, 1932, xvi, 87)

## *The Relationship of Intra-Ocular Pressure to Age.*

H K Müller, of the University Ophthalmological Clinic in Basle, has conducted a series of experiments to determine the relationship between age and intra-ocular pressure. He calibrated the eyes of cadavers of various ages, by means of a cannula attached to a Schiötz tonometer. The number of cases used was 60, the ages varying from 1 to 90 years. After full consideration had been given to various factors such as temperature, the period which elapsed between death and the experiment, and so forth, he was able to make certain definite deductions from his observations. The series of cases was divided into three age groups: 1 to 10 years,

20 to 44 years and 45 to 90 years. Each group gave a different calibration curve, that of the children being higher than that of the other two groups. Müller concludes that the child's eye has an average intra-ocular pressure of 29.5 mm Hg, while in the adult the pressure averages 26.5 mm Hg. Over the age of 45 the average pressure is 25 mm Hg. —(*Archiv für Augenheilkunde*, January, 1932, cv, 504)

### *Factors in the Success of Operations for Glaucoma.*

J. S. Friedenwald calls attention to the fact that sudden reduction of intra-ocular tension, as in operations that empty the anterior chamber of the eye, results in congestion of the ciliary body. The state thus produced resembles that found in acute glaucoma. To combat this effect the use of retrobulbar injections of adrenaline solution is advocated. The retrobulbar injection of novocaine with adrenaline is not a new procedure, many surgeons employ it as a routine in all intra-ocular operations. The features of the author's recommendation are first, the offering of a new rationale for the procedure, and second, the use of somewhat larger doses of adrenaline than have heretofore been used in common practice. The procedure is of especial usefulness in cases of congestive glaucoma and in glaucoma simplex in which the intra-ocular tension prior to operation is high. In non congestive cases and in those without high tension the post-operative course is usually uneventful even without this procedure. —(*American Journal of Ophthalmology*, March, 1932, xv, 189)

### *Phlyctenular Conjunctivitis in relation to Tuberculosis in Children*

H. I. Kinsey reviews the cases of phlyctenular keratoconjunctivitis referred during 1911-1930 to the chest clinic at the Hospital for Sick Children, Toronto, to determine whether there was any tuberculous disease of the chest. Other abnormalities, such as diseased tonsils and enlarged cervical glands, were noted during the examination, on account of the possibility of their having some relation to the eye condition. 136 cases were examined, and examination of the chest, physical and X-ray, revealed the presence of mediastinal tuberculosis in 75, pulmonary tuberculosis in 4, and negative chest findings in 29. Cervical adenitis was present in 17 cases. The tonsils were enlarged or diseased in 34 cases, and in 27 patients the tonsils had been removed before the patient appeared at the clinic. In the earlier years a fair proportion of the cases were treated with bacillus emulsion tuberculin, and in the past three or four years tuberculin antigen has been used. The author feels that the antigen has been of great assistance in clearing up many severe and otherwise refractory cases. Although there is no question as to the presence of a tuberculous infection in the majority of these cases, no definite relationship has been established between the presence of that infection and the presence of phlyctenular conjunctivitis. The author does not consider that the presence

or absence or removal of tonsils are factors in this disease, and has reached no definite conclusions as to its etiology —(*Canadian Medical Association Journal*, March, 1932, *xxvi*, 298)

### *The Treatment of Umbilical Hernia*

R H Miller points out that umbilical hernia is a subject about which one to-day hears little discussion and reads still less, although it is one which is constantly being seen in any large clinic and is responsible for a certain number of deaths. He presents a study of cases which had entered the Massachusetts General Hospital from 1911 to 1930. The total was 349 cases, of which 289 (83 per cent) were simple, with 7 deaths, a mortality of 2.4 per cent; 60 were strangulated, a total of 17 per cent, with 18 deaths, a mortality of 30 per cent. An examination of the cases for ten years only (1921-1930) showed the striking fact that the percentages were similar. The author makes the following important deductions from his series of cases: of simple umbilical hernias, 17 per cent, or 1 in every 6, will strangulate. Of strangulated umbilical hernias, 30 per cent, or 1 in every 3, will die. Every case of simple umbilical hernia has 1 chance in 6 of strangulation and 1 chance in 18 of dying of the hernia. The operation for simple umbilical hernia presents a mortality of slightly under 3 per cent, or about 1 case in 33. Operation of election for simple hernia is safer than "scientific expectancy," and therefore operation should always be urged in preference to the use of mechanical supports —(*New England Journal of Medicine*, February 25, 1932, *ccvi*, 389)

### *The Treatment of Cancer of the Larynx*

L Colledge and R Peacock publish an analysis of 126 cases of malignant disease of the upper air passages treated during a period of ten years, 1921-1930. Hospital and private cases are reported separately owing to the difference in operative mortality. Of 42 total laryngectomies the operative mortality is 9, or 21.4 per cent, of these 42 cases, however, 20 are hospital patients with an operative mortality of 8, or 40 per cent, and 22 are private patients with an operative mortality of 1, or 4.5 per cent. Similarly, amongst the 11 cases of laryngo-fissure, 6 are hospital patients with 1 operative death, and 5 are private patients without mortality. Taking together all private patients in this series, upon whom laryngo-fissure, partial laryngectomy or total laryngectomy was performed, there were two operative deaths out of 30 cases, or an operative mortality of 6.6 per cent, if those cases upon whom laryngo-fissure was performed are excluded this operative mortality is 8.0 per cent. If hospital and private patients are considered together the operative mortality for the whole series is 11 out of 57 cases treated surgically (other than by tracheotomy), or 19.3 per cent, and, if laryngo-fissure is excluded, 10 out of 46, or 21.7 per cent. It is thought by the authors that the factors responsible for this difference in the operative mortality rate are (1) The less robust physical condition of the hospital patients (2) The fact that the management and care of hospital patients after operation is largely and unavoidably entrusted to a frequently changing staff, whereas private patients are entirely under the

control of the surgeon and a permanent staff of nurses. Apart from this factor of operative mortality, hospital and private cases are considered together. Thirty-one patients are free from disease out of a total of 56 treated surgically (excluding 3 tracheotomies and 1 exploratory fissure), i.e. 55.3 per cent, or out of 15 surviving operations, i.e. 68.8 per cent. Of the 33 total laryngectomies surviving operation 21, or 63.6 per cent, remain alive and well in the case of laryngo-fissure this percentage is 80.0. Considering the group as a whole, excluding laryngo-fissure, 23 patients, or 65.6 per cent, remain alive and well out of 35 who survived their operation, in the remaining 12 cases the disease recurred. Of these 23 patients 11 have now remained free from disease for a period of three years or more, 9 for from one to two and a half years, and 3 for, as yet, under a year. In the case of laryngo-fissure 5 have remained well for a period of three years or more, and 3 for from one to two and a half years. It seems, therefore, that with proper selection of cases in the future, that is to say, if the surgeon has no bias towards laryngo-fissure, partial or total laryngectomy but is prepared to undertake the most suitable operation for each case, it will not be unreasonable to expect a success of 90 per cent for laryngo-fissure. In the jaw and nasopharynx the cases are few, but they seem to indicate that the future lies with radiation. In the larynx and lower pharynx radiation has failed to establish itself. There are at present three patients who possess a larynx perfectly normal in appearance after treatment by radium and who would otherwise have undergone total laryngectomy. These results, however, have been so disastrous in other patients, that these three cases seem only to indicate that radium should be reserved for exceptional cases—(*Journal of Laryngology and Otolaryngology*, 1932, xlvii, 161)

### *Ophthalmic Signs in Anaesthesia Administration.*

K. E. Madan, M.D., D.O.M.S., Lecturer in Anaesthetics, University of Punjab, Lahore, writes. From my experience as an instructor in anaesthetics I find that some knowledge of eye disease is a great help to anaesthetists. There are patients in whose eyes abnormalities or variations are present in the size and reactions of the pupils, in corneal sensitiveness, etc., which are apt to puzzle or mislead the anaesthetist, resulting in serious accidents. Hence before administering anaesthetics, just as the heart, lungs and urine are examined, so should certain points about the eyes be noted, such as the size, shape, reactions and colour of the pupils and the corneal sensitiveness of both eyes, and it must be ascertained if any morphine or atropine has been injected and if the patient has had any eye trouble in the past. It should be remembered that the cornea is insensitive in certain diseases, e.g., keratitis neuroparalytica, herpes zoster and absolute glaucoma, contracted and fixed pupils are found in cases of iritis and irido-cyclitis, and the pupil will not dilate however deep the anaesthesia, in high myopia, glaucoma, optic atrophy, contusions of the eye, after diphtheria and herpes, and in genuine amblyopia, the pupils may be dilated, the pupillary light reaction is absent in cases of iritis with synechiae, absolute glaucoma, lesions of the reflex path, and the Argyll Robertson pupil.



# Reviews of Books

*Diseases of the Kidney* By W GIRLING BALL, FRCS, and GHOFFREY EVANS, MD, FRCP London J and A Churchill, 1932 Pp viii and 424 Coloured plates 8, text figures 159 Price 36s

THIS happy association of a physician and a surgeon of the same teaching school reminds the reader of a similar successful combined work on "Diseases of the Lungs" by Sir James Kingston Fowler and the late Sir Rickman Godlee, who were colleagues at the Brompton Hospital. Joint authorships, such as these, ensure a wider and more complete survey of the treatment of the diseases. After a consideration of the development, anatomy and physiology of the kidneys, there follows a summary of the signs and symptoms of renal disease, including the urinary changes, œdema, the relation of kidney lesion to vascular changes, and uræmia, which is classified under the heading of pseudo-uræmia and uræmia. A practical chapter on the methods of examining a urinary case saves repetition later on in the accounts of the individual diseases and gives the tests, such as those of the urine and of renal function, which a physician would naturally employ, and those in which help might be sought elsewhere, such as cystoscopy, ureteric catheterization, radiography and pyelography. These latter sections and those on congenital lesions of the kidney and ureter are especially well illustrated. The classification of Bright's disease never fails to attract writers on renal affections, and has recently been much to the fore, the items in this well-arranged volume are toxicæmic kidneys, nephrosis, and acute nephritis, divided into diffuse, focal, embolic and interstitial, chronic nephritis, chronic interstitial nephritis and hyperpiesia. Although hyperpiesia is admittedly not a form of Bright's disease, it is included therein because of the difficulty which may arise in making a differential diagnosis from chronic nephritis in any particular case. Non-nephritic hypertension is divided into (i) symptomatic and (ii) idiopathic, essential hypertension or hyperpiesia in the sense that Allbutt, who disapproved of the term tension as a synonym for blood-pressure, employed it. The surgical affections of the kidney are admirably set out, and again well illustrated, especially the striking coloured plate of renal carbuncle, many of the figures are naturally taken from specimens in the Museum of St Bartholomew's Hospital, and it is pleasant to come across a number of references to the teaching of a consulting physician to the Hospital—Sir Wilmot Herringham—whose book on diseases of the kidney came out before the outbreak of war.

*Fractures* By MEURICE SINCLAIR, CMG, M.B., B.Ch. Modern Surgical Monographs London Constable & Co., 1931 Pp xxviii and 550 Illustrations and diagrams 337 Price 24s

THIS book is a monograph on fractures and embodies the experience of the author in this branch of surgery during and after the war. The work is divided into two parts: the first part deals with etiology, pathology and the general principles of treatment, and the second with the treatment of individual fractures. A commendable feature of the first section is the portion dealing with the more mutilating forms of violence and where recourse

to amputation is the only therapeutic measure possible. The experience of the author in limb fitting at Netley enables him to give sound advice upon the type of amputation that should be performed and the kind of artificial limb that is most likely to be suitable afterwards. Major Sinclair is not particularly favourable to the Syme's amputation, owing to the liability to skin abrasions not truly end-bearing and owing to the fact that the stump is. This objection is shared by other recent writers with experience in limb fitting. The treatment of individual fractures in the second part of the work is dealt with in great detail. The author depends upon the Thomas splint and its modifications in nearly every case, even in fractures about the ankle this familiar appliance is used for the maintenance of correction and traction to the exclusion of all other methods. Major Sinclair rightly insists upon the great value of traction in most fractures of the limbs, and his views on the value of Kirchner's wire for such traction will meet with the approval of those who have used the method. This procedure bids fair to supersede caliper and screw extension. The author scouts the value of plaster of Paris in the treatment of fractures, but there is no doubt that plaster of Paris has its proper place in this branch of surgery, as the work of Böhler amply proves. However, this work can be thoroughly recommended to all those who have the handling of fractures, for it is well written and full of all the practical details so essential to success in what is often a difficult branch of surgery. The great value of the book lies in the fact that the author has restricted himself to describing and recommending methods which he himself has proved useful, and anyone wishing to know the variety of uses of Thomas's splint in the efficient treatment of fractures would do well to read this monograph, the text is clear, and the illustrations are many and excellent.

*Diagnosis in Joint Disease* By NATHANIEL ALISON, M.D., F.A.S.C. and RALPH K. GORMLEY, M.D. Oxford University Press London Humphrey Milford Pp. xii and 196 Coloured plates 6, Half-tone plates 3, Figures in text 50 Price 52s 6d

THIS volume is based on an exhaustive study of 289 cases of arthritis, at the Orthopaedic Service of the Massachusetts General Hospital and the Harvard Medical School. The work was prompted by the discovery that 29 per cent. of all cases of arthritis remain uncertain of diagnosis after completion of clinical tests to disclose their origin. A praiseworthy effort has been made to avoid confusing nomenclature, and the authors rightly plead that misleading terms should be abandoned, a plea to which we lend our hearty support. In considering the cases under their review, the authors have endeavoured to answer three questions: what is the etiological factor? what joint tissue is primarily affected? and what is the change in the joint tissues? Obviously a painstaking and exhaustive effort has been made to answer these three questions. The subject matter is illustrated by a series of case histories, which are typical of the various types of cases under consideration. The work is attractively produced, and the illustrations, on the whole, are clear and instructive. Our only criticism is in connection with the radiographic reproductions. Only too often the reader

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ophthalmoscope is becoming almost as commonly used as the stethoscope. As the atlas is intended for the use of the non-specialist, only typical forms and the principal abnormalities and pathological appearances are included. The book is compact and easily handled, and should appeal readily to those to whom it is addressed.

*Clinical Lectures on Psychological Medicine*. By HENRY YELLOWEES, OBE, MD MRCP, DPM. London: J and A Churchill, 1932. Pp vii and 310. Price 12s 6d.

THE students at St Thomas's Hospital are fortunate in having Dr Yelloweas as their lecturer in psychological medicine, and most of the chapters in this book were delivered before an undergraduate audience at that hospital. Dr Yelloweas has succeeded in resolving the technicalities of his subject into everyday language, and thereby has dissipated many of its complexities. Throughout the book the practical, clinical aspect of the subject is stressed and it is insisted upon that patients should be regarded first and foremost as human beings, not as "mental cases". It would be difficult to find in any English textbook a more lucid and explicit account of the types of psychoneuroses with which a practitioner may be confronted, while the value of the lectures is enhanced by definite suggestions as to treatment: a section on sedative drugs merits special attention in this connection. The last chapter on "Psychology and Medicine" is in the nature of an appendix, as it was an address to psychologists, not to students, and deals with the scope and limitations of Freudian psycho-analysis. That Dr Yelloweas has a great respect for Freud is manifest in his expressed view that Freud has been to psychology all that Darwin was to biology and more. His criticism of psycho-analysis is therefore all the more valuable, and none but avowed Freudians will deny the fairness of it.

*Physicians' Manual of Birth Control for Members of the Medical Profession only*. By ANTONETTE F HONIKOW, MD, formerly Visiting Physician, New England Hospital for Women and Children. London: Baillière, Tindall and Cox, 1932. Pp xiv and 245. Figs 21. Price 12s 6d.

AN unusual feature of this essentially practical handbook is a special page in the introductory matter addressed to the "busy practitioner," and pointing out the pages on which the approved methods are described so that theoretical considerations and discussion of other methods can be temporarily skipped. The term "birth control," coined by Mrs Margaret Sanger, the American author of *Family Limitation* (1915), has been erroneously thought by some to refer to abortion, and to correct this impression the word "prevention" has been suggested, but is hardly likely to supersede the older one. This manual by one who has fitted about five thousand women with pessaries and found very few who did not learn the technique easily, describes the various methods of preventing the spermatozoon from fertilizing the ovum. Sterilization of women by X-rays, coitus interruptus, condoms, douches alone, and chemical antiseptics alone, are not regarded as satisfactory. The methods of fitting pessaries of different kinds are fully described and illustrated.

# Inventions and Preparations

## ELITYRAN

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Elityran is a special fractionated preparation of the natural thyroid gland, having an iodine content of 0.4 to 0.6 per cent in the form of iodo-albumin, the iodine content in comparison to thyroxin is as 1 : 100, although the therapeutic action has proved to be definitely superior to that of thyroxin. Elityran also shows several distinct advantages over *thyroidea sicca* of the British Pharmacopœia in that it is accurately standardised, ordinary thyroid extract being assessed only roughly according to its iodine content. It is now believed that the iodine content alone is no definite guide to the therapeutic activity of the thyroid gland. The standardisation of elityran is reckoned in guinea-pig units, one unit being that amount required to reduce the weight of a guinea-pig by a certain amount within a certain time. Each 25 mg of elityran contains ten such guinea pig units. It has been found that many patients who cannot tolerate ordinary thyroid preparations because of cardiac palpitation and nervous upset, may be given elityran without any unpleasant sequelæ. The usual scheme of dosage for obesity is 25 to 50 mg per day initially, gradually increased to 25 to 50 mg three times a day. In severe cases of obesity or myxœdema the dosage can be increased to 50 to 75 mg three times a day.

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**McMENEMY, W H, M B, B Ch**, appointed House Physician, North Western Hospital, London County Council

**MURRAY, J D, M B, Ch B Aberd**, appointed Certifying Factory Surgeon, Grays Essex

**NORRIS, T St M, M B, B Chir Camb**, appointed Assistant Medical Officer, North Eastern Hospital, London County Council

**PATRICK, A, M B Edin, F R C S F**, appointed Hon Assistant Surgeon, Hull Royal Infirmary

**PITT, H L, L D S, R C S**, appointed Honorary Dental Surgeon, Paddington Green Children's Hospital

**PRATT, F W M, M B, B S, F R C S**, appointed Honorary Surgeon to Outpatients, Paddington Green Children's Hospital

**PRICE, I, M B, B S Lond, F R C S Eng**, appointed Deputy Medical Superintendent, Bethnal Green Hospital, London County Council

**ROWLANDS, J L, M B, Ch B Glas**, appointed Certifying Factory Surgeon, Llanelledau District, Carnarvon

**SAMUEL, BERTRAM, L D S, R C S**, appointed Consulting Dental Surgeon, Paddington Green Children's Hospital

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**STEPHEN, R A M B, Ch B Aberd**, appointed Assistant Resident Medical Officer, Queen Charlotte's Maternity Hospital

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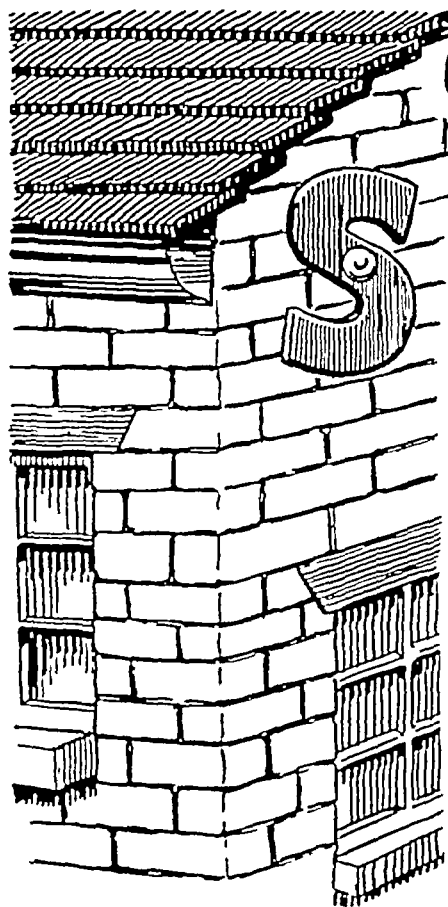
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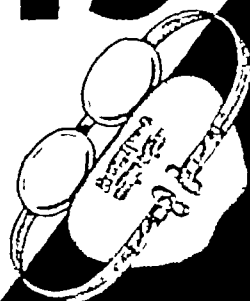
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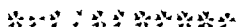
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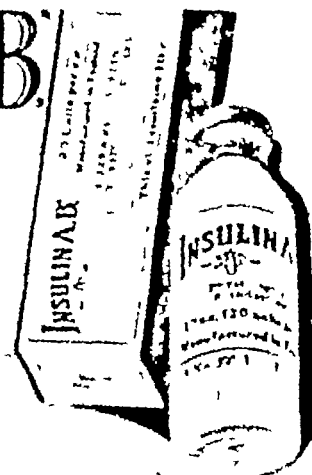
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Distilled from freshly killed English meats—nothing whatever added. Famous for over 100 years for all cases in which the patient is unable to accept more solid diet.

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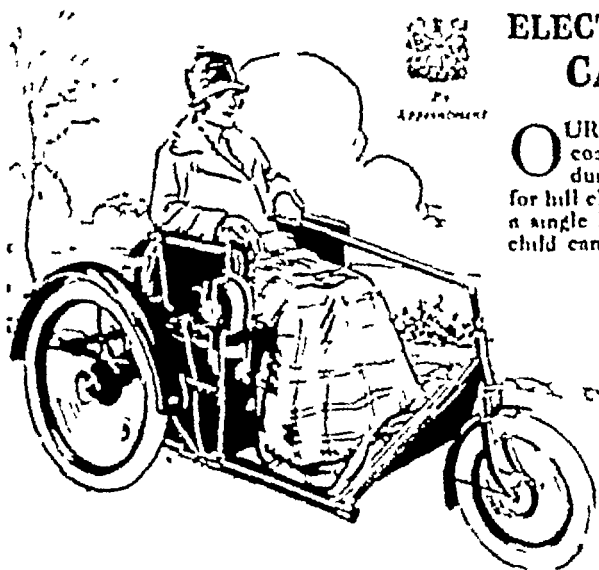


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Composition  
Preparation  
and analysis

# SANATOGEN

Easily digested and assimilated.

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A NASAL JELLY  
*containing*  
EPHEDRINE & ADRENALIN  
*for*

HAY FEVER, RHINITIS and ACUTE COLDS

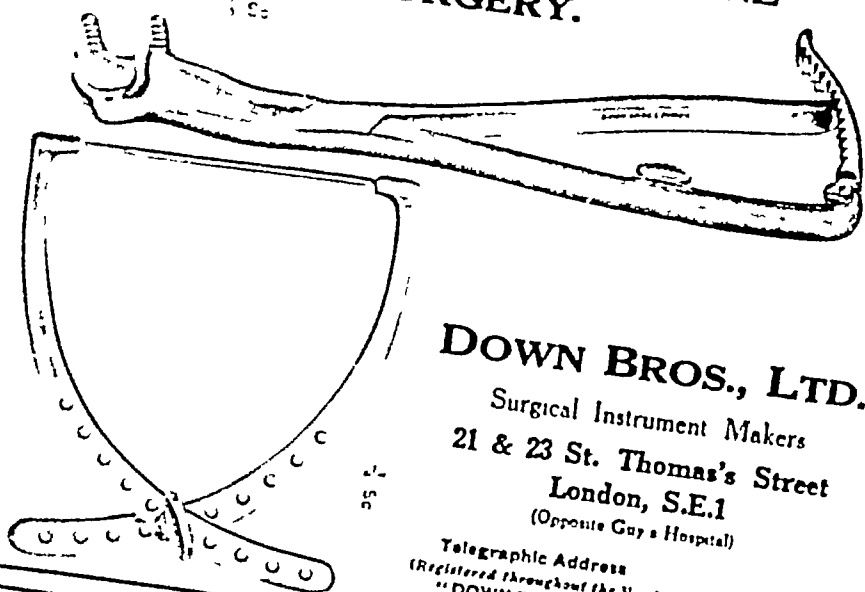
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## Neuralgic and Myalgic Pains are promptly relieved by

# Antikamnia Tablets



Prescribed with marked effect in Neuralgia, Migraine, Sciatica and Neuritis, they may also be employed with benefit in Rheumatic Affections. They control the Headache and Myalgic Pains of Influenza and exert a definite antipyretic action in febrile conditions. Antikamnia does not depress the heart nor derange the digestion.

## Antikamnia with Codeine Tablets

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Tablets and  
Antikamnia  
with Codeine  
Tablets are  
sold in all  
chemistries and  
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 "I saw the influence of this preparation on the red blood cells in a number of cases  
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- (1) Fuhr "Anaemia, its Causes and Modern Treatment" (Leipzig)
- (2) Erndt (Uppsala University) "Some Investigations into the Pharmacological Properties of Chlorophyll"
- (3) Buerger (Bonn University) "Therapeut. Monatshefte" 1911, 2, 1—*Deut. Med. Wochen.* No. 33—*Schweiz. Pflanzenges. Med.* No. 14

This preparation may be prescribed in the usual way and will be dispensed by chemists accordingly.

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Distributors

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## INDEX TO ANNOUNCEMENTS

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(Continued on page xxiv)

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THE RAKE'S PROGRESS

THE ELECTION

BY WILLIAM HOGARTH  
Engraved by J. E. JACKSON & CO.



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accuracy for  
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## FOR MENTAL DISORDERS,

### NORTHAMPTON.

FOR THE UPPER AND  
MIDDLE CLASSES ONLY

PRESIDENT—THE MOST HON. THE  
MARQUESS OF EXETER, C.M.G., A.D.C.

MEDICAL SUPERINTENDENT

DANIEL RAMBAULT, M.A., M.D.

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 In Serum or Syrup form.  
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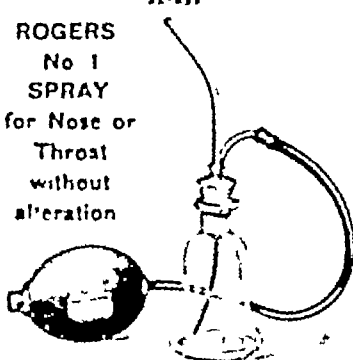
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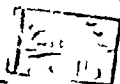
THE PRACTITIONER

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(Continued on page XVII.)

WHEN you wear  
a HAWESCAN  
Shirt and Collar you  
set the tone  
for the rest of the outfit.  
The shirt is still  
the center of the outfit.  
Three  
looking well-cut  
and strong—are  
made expressly for  
good service. Ob-  
servable in pattern  
giving the right  
look to both sports  
and the city wear.  
The day is ended.

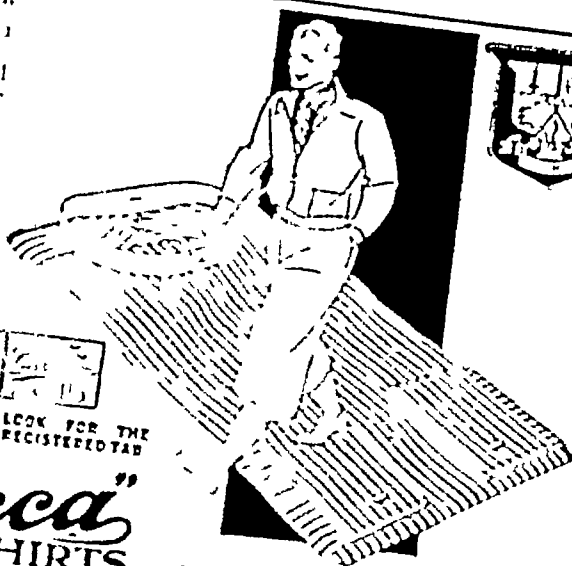
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SOFT COLLARS SHIRTS  
& PYJAMAS

COLLARS & PYLIMAS  
MADE BY LEADING WORKERS, COMFORTABLE  
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*[Faint handwritten notes at the bottom of the page, likely bleed-through from the reverse side.]*

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To-day, authorities are stressing the importance of the essential mineral salts. In addition to building sturdy bones and blood rich in hemoglobin these mineral elements aid metabolism and contribute to nervous stability.

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Compound Syrup of Hypophosphites

TRADE

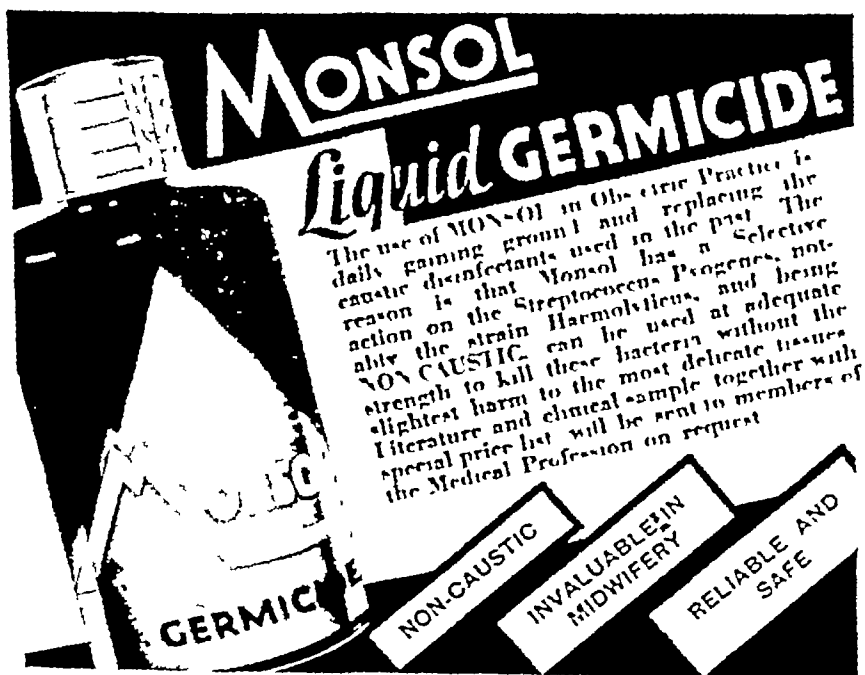
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- Some Points in the History
- The Treatment of Acute Nephritis
- Prophylaxis of Venereal Disease

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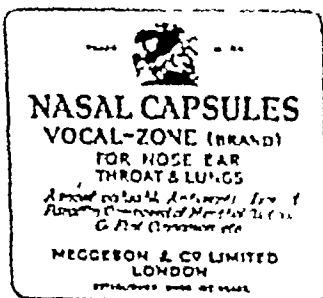
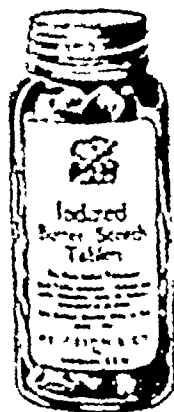
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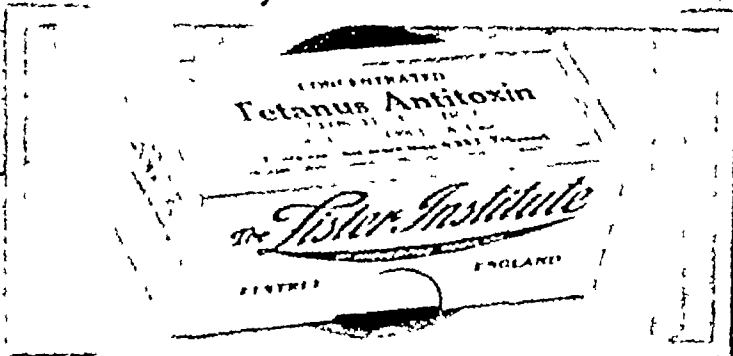
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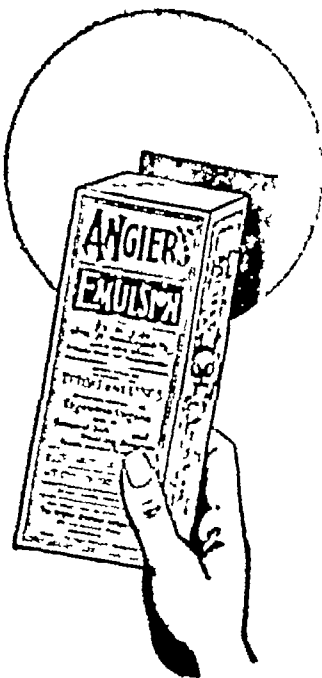
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*(Brit. Med. Journ. November 15th, 1930, p. 807)*

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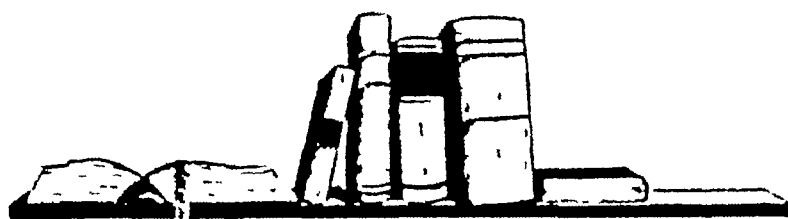
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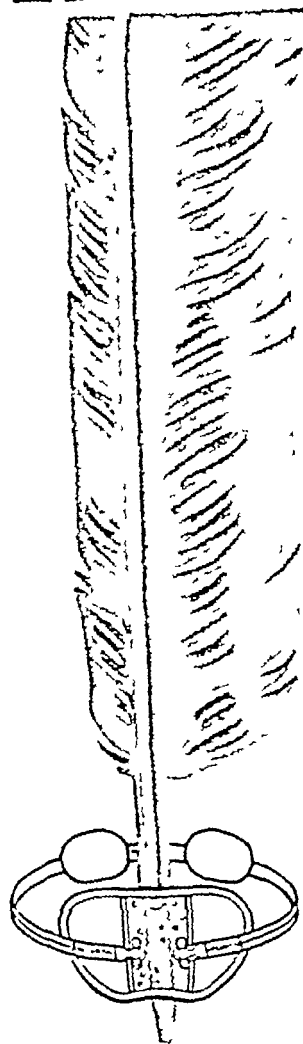
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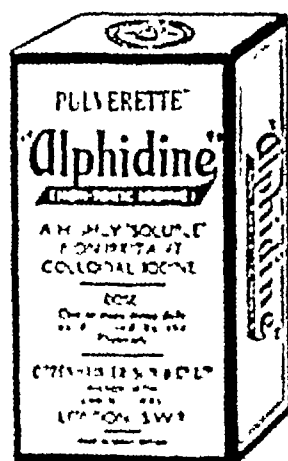
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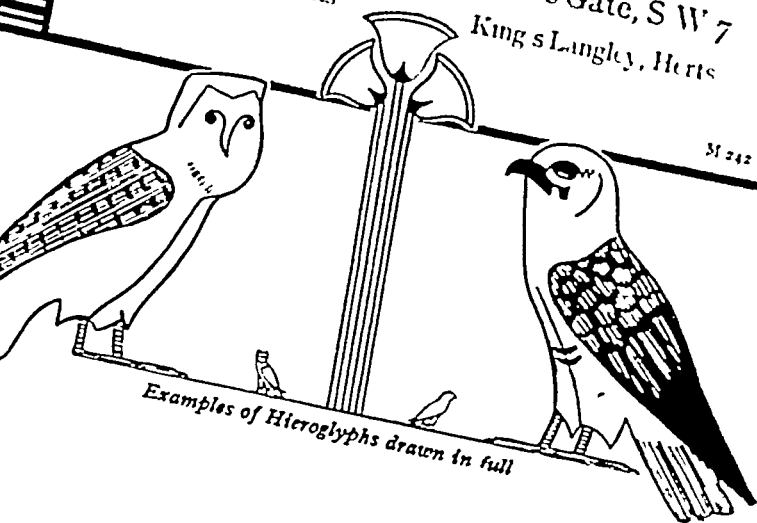
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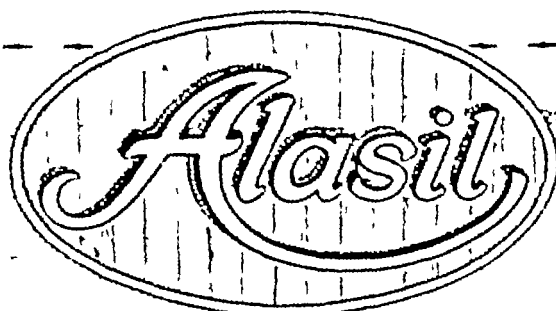
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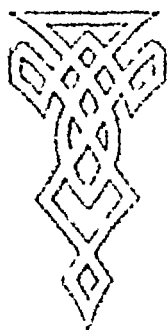
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Acetyl-salicylic acid possesses a notable disadvantage. Physicians have proved that it cannot be tolerated by patients suffering with a delicate stomach. Consequently, the value of this medicament in the wide field in which it is indicated is very seriously reduced.

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"Alasil" is therefore a triumph over acetyl-salicylic acid. It enables higher doses to be administered and maintains the patient's system under its influence for a greater length of time. Analgesic, Antipyretic and Sedative, "Alasil" is indicated in all cases where acetyl-salicylic acid has been used heretofore.



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"Alocol" is the practitioners' safeguard when alkaline medication is required. Its clearly defined antacid properties exceed those of bicarbonate of soda, magnesia and subnitrate of bismuth; furthermore, "Alocol" eliminates all the unpleasant drawbacks which are particularly feared with the usual alkalis and oxides.

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"Alocol" is highly recommended for use in all cases of hyperacidity, against which it is a specific. It is also indicated in the more serious manifestations, such as gastrectasis, gastrelcosis, pyloric and duodenal ulcers, etc.

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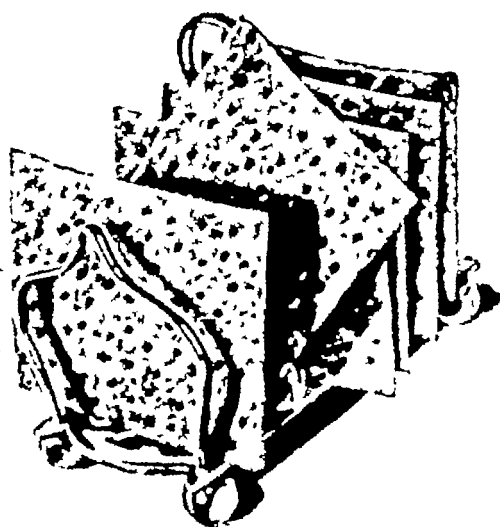
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Moisture -	4.90	45.00
Protein -	10.32	6.30
Fat -	7.90	1.20
Carbohydrates, etc.	74.28	46.30
Mineral matter, ash, etc.	2.60	1.20
	<u>100%</u>	<u>100%</u>
Calorie Value per lb.	1846	1105

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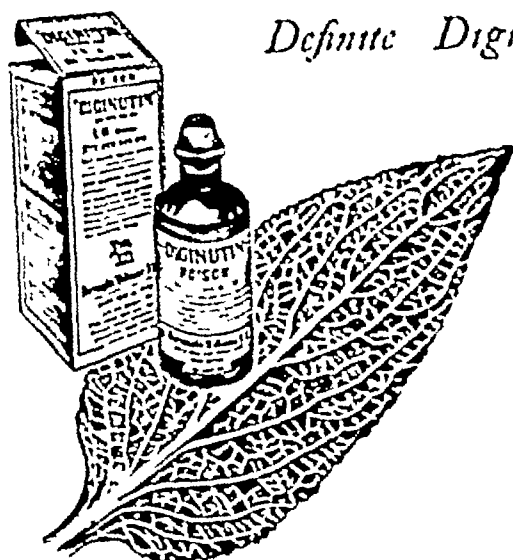
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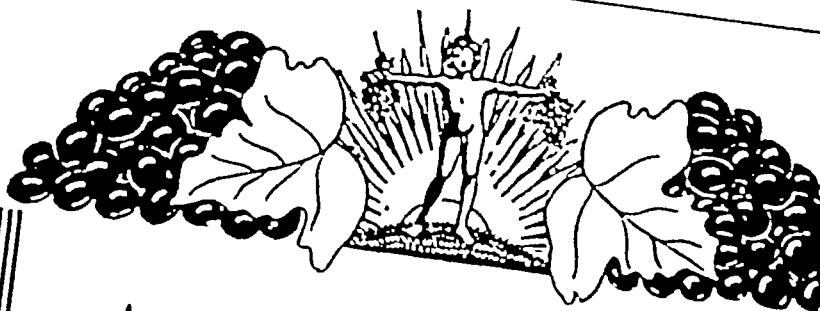
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## ENO'S "FRUIT SALT"

J C ENO LTD, 160 Piccadilly, London, W 1

# THE PRACTITIONER

No. 768

JUNE, 1932

Vol CXXVIII

## The Indications for Exploration of the Abdomen

By ZACHARY COPE, M.S., F.R.C.S.

*Surgeon to St Mary's Hospital, Senior Surgeon to the Brompton Hospital, Examiner in Surgery to the University of London*

THE need for abdominal exploration has greatly diminished during the last twenty years. An increased number of diagnostic methods has made it possible for the surgeon to know approximately what he will find when he opens the abdomen, and the element of doubt has been much diminished. This great improvement has been achieved by advances in radiology, bacteriology and biochemistry. Particularly has radiology transformed diagnosis by its bloodless exploration of the hollow viscera and tubes, and by its painless demonstration of the presence of stones. Even when the surgeon is fairly sure of his diagnosis on clinical grounds he will nearly always be wise, if time and circumstances permit, to obtain the evidence furnished by X-rays before opening the abdomen. There are still some practitioners who have insufficient recourse to the X-rays. They consider that clinical evidence is better than radiological. To exclude X-rays from abdominal diagnosis is just as foolish as for a very short-sighted person to refuse the aid given by corrective glasses.

The science of diagnosis of disease within the

abdomen has also been greatly furthered by test-meals, blood examinations, biliary drainage, and the various tests for renal function, not to mention the various instruments for seeing inside cavities—the cystoscope, the sigmoidoscope and the gastroscope. In what group of cases can we then say that it is necessary to open the abdomen as a pure exploration? We must carefully distinguish the indications in *chronic* from those in *acute* abdominal disease, for in the latter many methods of investigation are not available. Generally speaking, if in a chronic case all the available methods of investigation have been undertaken and doubt still remains as to the origin of symptoms which are causing serious anxiety, one should counsel exploration.

Three groups of cases need to be considered:—(1) Those in which there is obvious anatomical alteration in the abdomen. (2) Those in which there is serious physiological derangement, which may be due to organic disease. (3) Severe and persistent pain.

(1) One of the commonest anatomical alterations for which exploration is necessary is the presence of a *tumour*, of doubtful nature. Most abdominal tumours can be diagnosed by the methods at our disposal, but great difficulty may be experienced in determining the nature of retro-peritoneal tumours, enlarged abdominal glands, hydatid tumours, and scattered tuberculous or malignant foci in the peritoneal cavity. Again, a chronic abscess may persist until the memory of the originating acute attack has been forgotten, and only an exploration will discriminate it from a mass due to malignant disease. A chronic abscess of septic origin may be unattended by fever or notable leucocytosis. A tumour in the abdomen is abnormal and may portend serious trouble, so that its nature ought not to be left in doubt for long.

The diagnosis of the cause of *acute accumulations* may be impossible without an exploration of the

abdomen. The common intra-abdominal causes of great amounts of free fluid are hepatic cirrhosis, tuberculous peritonitis and malignant deposits on the peritoneum. When after removal of the fluid it is still impossible to diagnose the cause, exploration has a limited field of use. It is unwise and unnecessary to make a big incision into such patients. All the necessary information may be attained through an inch-long incision, which can be made under local anæsthesia. This will neither incommode the patient nor cause him any risk. For this class of case I have devised a special instrument (the coelioscope)\* which enables one to inspect the interior of the abdomen. It consists of a long oval tube something like the sigmoidoscope but with a bevelled end completely closed by a glass window. An electric light is passed along to the distal end. The whole apparatus can be sterilized by boiling. By its use exploration in ascitic cases is converted into a minor operation.

(2) Those symptoms indicative of physiological derangement which call for abdominal exploration are chiefly such as may be caused by organic disease amenable to surgical treatment. Needless to say, exploration is only to be undertaken when other means of diagnosis fail. Under this heading would come persisting jaundice, vomiting of obscure origin, severe and increasing constipation or alternating constipation and diarrhœa, bleeding and the passage of mucus from the rectum when no lesion can be seen by the sigmoidoscope.

When jaundice first appears it is often taken to be due to catarrh of the duodenum, but when it persists for weeks it may be necessary to explore in those

---

\* No priority is claimed in investigating the abdominal cavity by means of an electrically illuminated tube. Twenty years ago H. C. Jacobæus introduced a clever technique for this purpose and various methods have been tried. We do not think, however, that any of the instruments have been so generally useful as the one here described.

cases where no tumour can be felt and a cholecystogram gives no indication of gall-bladder disease

Persisting and increasing jaundice without pain is commonly due to carcinoma of the head of the pancreas. In such cases great relief follows diversion of the bile from the distended gall-bladder into the intestine or stomach.

Persisting or recurrent vomiting of doubtful origin and leading to serious loss of weight sometimes calls for an exploration. In one such case recently I found an early cancer of the stomach which had not been suspected and which was removed successfully.

Symptoms which may be due to an early cancer of the colon or upper rectum are usually elucidated by sigmoidoscope or barium enema, but if these methods fail to show anything abnormal and the symptoms persist it is wise to explore.

(3) It is very difficult to give a list of those cases where pain alone justifies exploration, but there is no doubt that many serious abdominal conditions may first call attention by pain long before it is possible to demonstrate any other symptoms. Among these may be mentioned the following:—(1) Early cancer of the stomach. (2) Ulcer in the second part of the duodenum. (3) Cancer of the small intestine. (4) Tuberculous adenitis of the mesenteric glands. (5) Some cases of appendicitis and cholecystitis.

When no other symptom but pain is present it is important to consider what are the characteristics of pain due to organic disease. With most organic diseases of the abdomen pain is intermittent or periodic and tends to get worse in successive attacks, whilst constitutional depreciation usually manifests itself. Loss of weight is of special consequence. The pain is very frequently associated with some accessory symptom which testifies to its severity, e.g. sweating or vomiting.

On the other hand, when a patient complains of a

pain which is constant, has no definite relation to meals, is said to be agonizing in intensity yet is unaccompanied by vomiting or sweating, and does not interfere with sleep, then one must suspect the mind of the patient is distorting the impressions from what is probably a minor derangement. A psychic cause of pain must never be entertained until every means of diagnosis has been tried.

It will occasionally happen that decisions have to be made out of reach of modern methods of diagnosis. One can then take the view that general depreciation of health, accompanied by symptoms which are very likely due to organic disease in the abdomen, is an indication for exploration.

We must next consider briefly when one ought to explore the abdomen of a patient who is in the throes of an acute attack of abdominal pain. Here one cannot wait while an extensive series of investigations is carried out, but there is a larger field for the exercise of accurate clinical knowledge. By careful attention to minor points the majority of cases of acute abdominal pain can be diagnosed. But there remain a minority of cases which present no clear picture and give rise to doubt as to whether operation is needed.

What should be the practitioner's procedure in such cases? In the first place, in all cases of acute abdominal pain of any severity and uncertain diagnosis it is a wise (and in the writer's opinion a necessary) plan to divide the responsibility as soon as possible. There are few districts in which there is not a good supply of consulting surgeons, and well-equipped hospitals can nearly always be reached fairly easily. Instead of waiting to see what happens, it is wiser to have a consultation (if the patient's means allow of it) or alternatively to arrange for admission to a hospital where continuous observation can be kept on the patient. Remember that most cases of severe



abdominal pain lasting more than six hours are of surgical significance, and though they may not need operation they will benefit by the opinion of a skilled surgeon.

Secondly, since the question of exploration depends entirely upon clinical grounds, let the examination be thorough. From a considerable experience of my own and others' mistakes I think the most commonly neglected points are the examination of the rectum, urine, hernial orifices, pupils and knee-jerks, and the chest.

With the greatest clinical acumen there will still remain a number of doubtful cases. If after a full examination there still remains a chance that the condition may be a perforated ulcer, an obstruction of the small intestine, an appendicitis of the obstructive type, or a severe intraperitoneal hæmorrhage, then exploration is necessary. In some cases which present obvious signs of advanced peritonitis exploration is often advantageously postponed till restorative measures have been carried out. Patients who have severe distension without vomiting due to obstruction of the large bowel can usually wait till the effect of enemata has been tried. If the enemata give no relief exploration or a blind cæcostomy may be needed.

There are two particular problems which must finally be referred to: The first is when one should explore in a case of abdominal injury. The second concerns the question of differential diagnosis between acute thoracic and acute abdominal conditions. It is often difficult to know when to explore in cases of severe abdominal injuries when the abdominal wall is intact. In general, however, there is need to explore if severe pain persists for more than six hours after injury and is accompanied either by vomiting, rising pulse, or local rigidity tending to extend.

The discussion of differential diagnosis between thoracic and abdominal conditions does not come into

our present survey, but when after all investigations have been carried out, doubt as to which cavity is involved remains, then we consider it wise to explore the abdomen under local anæsthesia through an inch-long incision. There is no need for a larger incision, for all severe abdominal conditions lead to an effusion of fluid which indicates abdominal involvement as soon as the peritoneum is opened. With a perforated ulcer one will find turbid fluid and possibly gas; with intestinal obstruction and with acute appendicitis clear fluid will be found; whilst with pancreatitis, mesenteric thrombosis and strangulation of gut there may be sanious fluid escaping. If by the presence of such fluid abdominal disease is revealed, then the exploration must be extended as may be necessary. It is most unwise to give a general anæsthetic and make a large incision in any case where it is possible that the thorax may be the site of disease.

# A Case of Dercum's Disease

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WELL-marked examples of Dercum's disease are sufficiently rare in this country to be worthy of record. The fully-developed malady is easily recognized when its main characters are known, but the slight and early forms may readily be mistaken for other varieties of obesity. Many years ago, before any case of this malady had been reported in England, as the result of reading Dercum's description I was able to determine that a patient who had consulted my father, Dr W. Murray, in Newcastle, was suffering from this remarkable condition. Unfortunately, after some brief notes had been taken and the importance of a photograph had been mentioned, the patient took fright and refused to allow me to see her again to complete my notes, so that I was deprived of the opportunity of recording the first case in this country. In describing the present case the name of Dercum's disease has been retained for what may be regarded as a definite clinical entity. The name *adiposis dolorosa* is apt to be misleading, as pain and tenderness in some cases are only temporary symptoms and by no means prominent features. The pathology of the disease is open to doubt, though it is probably due to some form of dyspituitarism which develops in the adult, allied to adiposo genital dystrophy, which is the result of hypopituitarism occurring earlier in life. The record of the following case is brief and incomplete as, for family reasons, the patient would only remain in hospital for a few days:—

Ms. J. B., aged 44, was brought to the Manchester Royal

Infirmity complaining of her enormous bulk, difficulty in walking as her legs were unable to support her properly, and constant aching pains which were increased by movement but were confined to the arms and legs. Earlier in life she had suffered from rheumatic fever, and had gall stone colic seven years before admission. Five years previously she had had a miscarriage, this was followed by aching pain in the left leg, which then began to increase in size. This leg continued to enlarge during the following year when she became pregnant again and was confined prematurely at the end of seven



FIG 1



FIG 2

months. The right leg then became affected in the same way and the swelling gradually extended to the other parts of the body which are now involved.

She has been pregnant eight times and has four children living, the eldest being 21 and the youngest 4 years old. The two first children, born 24 and 23 years ago, both died at birth. Menstruation has always been irregular, and nine years ago it ceased for a period of three years. Since the birth of the last child four years ago, she has menstruated about every two months. There was menorrhagia

during last year, but no dysmenorrhœa.

She is remarkably active for her size and carries on her own housework. In order to do this she is obliged to carry a chair about with her so that she can sit down to work. She never goes more than a few yards away from home. She is a cheerful and plucky woman, who makes light of her disability. As her weight was beyond the capacity of the ordinary hospital weighing machine, she was taken to the store to be weighed, and her net weight was found to be 26 stones 8 lbs.

There is a large deposit of subcutaneous fat all over the trunk and limbs, so that the face, hands and feet look relatively small. The swelling is most marked on the legs, where it hangs in folds closely applied to each other but separated by sulci which are one or two inches deep. The abdominal wall shows marked thickening with large folds at the flanks. The pendulous abdominal wall in the erect position hangs like an apron as low down as the knees (Fig. 1). The breasts are large and pendulous, so that when she lies on her back the nipple lies in the mid axillary line. There is a large fold of fat on each side between the breast and the upper arm. On each side of the trunk there are three large folds between the breast and the groin. These are continued round to the back and there is a fourth fold continuous with the breast. The swelling is very noticeable on the posterior aspect of each arm (Fig. 2), and it extends down to the wrist. On the inner side of the lower third of each leg the skin is pink in colour and rough in contrast to the smooth skin of normal colour on the other parts of the body. The skin over this area is thickened, and the condition appears to be due to a localized lymphatic obstruction, though the dorsum of the foot is not involved. The face, hands and feet are not appreciably affected, and there is no accumulation of fat beneath the chin. The hair is normal in character, though some has been lost. The nails are normal in appearance. The thyroid gland is of normal size. There is no mental defect.

The following measurements are given to show the actual size of the various parts affected —

Circumference of neck	-	-	-	-	16 inches
"	"	right fore arm	-	-	14 "
"	"	left fore arm	-	-	13 "
"	"	right upper arm	-	-	23 "
"	"	left upper arm	-	-	20 "
"	"	chest	-	-	61 "
"	"	right calf	-	-	27 "
"	"	left calf	-	-	28 "
"	"	right thigh	-	-	34 "
"	"	left thigh	-	-	36 "
"	"	waist	-	-	71 "

There is no evidence that the deposition of fat is not symmetrical on the two sides of the body, as the right arm is larger than the left, while the left leg is larger than the right.

The urine is normal. Dr. Wharton kindly examined the eyes and reported that there was no abnormality, but there are no changes in the fundus. The retina and the field of vision is normal. Pathological

examination shows definite enlargement of the sella turcica but the clinoid processes are intact. No other abnormality was found. Owing to the short period during which the patient was under observation neither fuller investigation nor treatment was possible.

Although the weight of 372 lbs. is a striking feature of this case, considerably greater weights have been recorded. The patient observed by Winkelman and Eckel<sup>2</sup> was a coloured woman aged 50, who weighed 460 lbs. A case described by H. Grenet, R. Levent and L. Pellissier,<sup>3</sup> as an example of *obésité monstrueuse*, occurred in a woman of 37, who weighed 450 lbs. and showed just the same clinical features as my case, the illustrations presenting an appearance similar to those in Figs 1 and 2. In Winkelman and Eckel's case the chief features were obesity of typical distribution, with painful masses, ulcers on the legs and bullæ on the fingers, with asthenia. The pathological findings were an adenoma of the anterior lobe of the pituitary gland, with enlargement of the sella turcica, adenomatous hyperplasia of the left suprarenal gland, atrophy of the ovaries, and many recent hæmorrhages in the thalamus and subthalamic regions. These writers review the results of fifteen necropsies recorded in the literature. In only two of these were there no definite changes in the endocrine glands. Of eleven in which the pituitary gland was examined definite changes were found in eight. The thyroid gland was abnormal in twelve cases, the sex glands were altered in nine, the suprarenal in three, and the pancreas in two.

In Grenet's case various tests of the activity of the endocrine glands were carried out. The basal metabolic rate was found to be raised 18 per cent, which may have indicated a slightly increased activity of the thyroid gland. Cramal radiographs, ophthalmoscopic examination and the tests all failed to show any abnormality of the pituitary gland. In the ultimate pathological examinations the pituitary gland was not obtainable. Marked changes were found in the ovaries and in the thyroid gland. In the latter the chief

change was a proliferation of the alveolar cells, giving an appearance resembling that of the embryonic gland. The ovaries showed marked atrophic changes. As the onset of the malady occurred after a premature menopause, and she was a large eater, the authors attribute the condition to the changes in the ovaries and excessive intake of food, the thyroid and pituitary glands possibly playing a subsidiary part in the production of the malady.

D. J. McCarthy<sup>4</sup> mentions that the great majority of cases occur in women, and only a few have been observed in men. He gives an illustration of a well-marked case in a man observed by Dereum and himself in which there was a pituitary tumour. Thyroidal changes and defective development of the testicles were also present. Another case in a man aged 56 is illustrated by W. Falta.<sup>5</sup> This man had weighed as much as 308 lbs. On microscopical examination all parts of the hypophysis were normal in appearance. There was a "colloid struma" in the left lobe of the thyroid, but the rest of the gland was normal. Harvey Cushing<sup>6</sup> describes a similar case as one of "adult hypopituitarism with extreme corpulence (Dereum's disease)" in a woman aged 55, who weighed 302 lbs. The illustrations closely resemble those of my patient. As slight neighbourhood symptoms were present a decompression operation was performed and the pituitary gland was found to be "considerably larger than expected." She was given nine grains of dried pituitary gland daily, and by the end of a year the weight had fallen to 242 lbs.

With the evidence so far available the pathology of these cases is by no means clear. It appears probable that it is the result of some form of pituitary disorder, but a simple hypopituitarism does not account for all the symptoms observed, and in some cases evidence of a definite hypophyseal lesion is wanting. This case is recorded on account of its striking clinical features.

The enlargement of the sella turcica suggests that some lesion of the pituitary gland plays a part in the production of the condition, but its nature is uncertain, and this may not be the only endocrine gland concerned.

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# The Inoperable Prostate

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ALTHOUGH prostatectomy is the ideal form of treatment for the great majority of cases of prostatic obstruction, there must be a certain number of patients who, for some reason or other, cannot be subjected to this operation. This is not to be wondered at, when it is remembered that prostatic obstruction is a disease of old age, and that, because of its infirmities, the risks of operation are sometimes rendered too great to justify it being undertaken.

Alexander Randall<sup>1</sup> has shown that the incidence of prostatic trouble increases with each decade of life after the age of fifty. The following figures are taken from his work on "The Surgical Pathology of Prostatic Obstruction":—

ASCENDING INCIDENCE OF PROSTATIC HYPERTROPHY AS AGE ADVANCES

Patients over	Number of Necropsies	Prostatic Hypertrophies	Per cent
Years			
50	680	101	28.0
60	409	137	33.5
70	161	70	43.4
80	30	16	53.3
90	1	1	100.0

This indicates that out of 680 men past fifty years of age, 28 per cent had prostatic enlargement; of 409 past sixty, 33.5 per cent., of 161 past the three-score and ten mark, 43.4 per cent.; and of those over eighty years of age, 53.3 per cent suffered from prostatic disease.

Even allowing for the fact that improvements in the technique of prostatectomy and in its pre-operative and post-operative treatment have increased the scope

of the operation, and have made it possible for patients of advanced age, there must always remain some cases or whom it carries too high a risk. It will be useful herefore to consider if, for these patients, medicine offers any alternative. Before doing so, however, it should be remembered that it is not so much age itself that offers an obstacle to a major operation, but the infirmities that are likely to accompany old age. A hale old man of eighty may well be a better subject for prostatectomy than a patient of sixty with well-marked arterio-sclerosis or a doubtful myocardium. Sir John Thomson-Walker stated that in a series of cases the death rate was actually greater between the ages of fifty-five and sixty than between sixty-six and seventy, but H. H. Young, of Baltimore, has stated that, with negligible variations, the mortality rate increases gradually in each decade of life. The object of this article, however, is not so much to discuss the contra-indications to operation, as to consider what alternative lines of treatment are available in cases in which contra-indications definitely exist.

Treatment will be considered under the following headings: (1) medical treatment; (2) electro-therapy; (3) minor surgical proceedings.

#### MEDICAL TREATMENT

Although medical treatment has not any effect on the actual size of the prostate, it may influence the resulting symptoms. The obstruction cannot be explained entirely on mechanical grounds, Legueu, in particular, pointed out that in cases of prostate hypertrophy, two factors are at work, the static and the dynamic. The first is due to the mechanical obstruction offered by the enlargement, the second to a superimposed spasm of the sphincter. In some cases, the dynamic factor is the more important. It is well known that the severity of the symptoms from which a prostatic suffers varies greatly: for a few days he

may be able to pass urine with comparative ease, and has to rise at night on only one or two occasions. A week later it is with the greatest difficulty that he can pass any urine at all, and his rest is broken by two-hourly or hourly efforts to micturate. Formerly this variation was explained on the basis of congestion, an increase of symptoms being attributed to vascular engorgement. This view was, to some extent, supported by the observation that it is on rising in the morning that most patients experience the greatest difficulty in micturating; in other words, at that time when after being in the recumbent position, the gland is most likely to be congested. But, for various reasons, this explanation is not altogether satisfactory, and it is more probable that an increase in the severity of symptoms depends on the sphincter rather than on the state of congestion of the prostate.

The stress laid on spasm rather than on mechanical obstruction is part of a general tendency in urology to emphasize the dynamic at the expense of the static. Formerly, hydronephrosis was explained mainly on mechanical lines; but, as obstructive factors, such as aberrant vessels, kinks in the ureter, and strictures were not always forthcoming, urologists were forced to conclude that many cases of hydronephrosis were due to a neuro-muscular defect rather than to the existence of an obstruction. What has happened in the case of the kidney is now happening in that of the bladder. The enlargement of a prostate is often such as to make it difficult to believe that it can directly obstruct the passage of urine. It must therefore be assumed that there exists also a condition of spasm of the sphincter.

If medicine is powerless to influence the growth of the prostate, it can at any rate hope to modify the action of the sphincter. It is possible that by reducing congestion, it may even have some influence on the size of the gland. As E. L. Keyes aptly put it, "The prostatic man resembles the menstruating woman in that

any exposure or over-fatigue reacts promptly upon his pelvic organs." The keynote of his life should therefore be regularity and moderation. Exposure of every sort is bad for the patient and suitable climatic conditions should, if possible, be obtained. These undoubtedly exercise a profound influence on the comfort of the prostatic.

A medical man with moderate enlargement under my care is in the happy position of being able to arrange his life so as to minimize his discomforts, and finds that so long as he spends his winters abroad in a warm, dry climate, his symptoms of frequency and difficulty trouble him but little. Should he, however, be persuaded to return to England before summer has arrived, he immediately pays for his indiscretion. During the four years he has been under my observation his prostate has increased in size, but in spite of this his residual urine has remained constant and his symptoms have, if anything, improved. I do not suggest that he would not have been better off had he submitted to prostatectomy, but since he is determined to avoid operation, his method of life may be considered successful.

If a patient is unable to seek a favourable climate he must at any rate avoid the risks of chill. A very slight alteration in the peripheral circulation reacts on the state of the urinary system, by producing either congestion or spasm. Warm clothing in the neighbourhood of the pelvis is always indicated. Since perspiration is good for the prostatic in that it assists the action of the kidneys, it is better to err on the side of over-clothing than of the reverse. Indeed, sometimes benefit will be derived from a sagacious use of Turkish baths, provided that no other contra-indication exists.

Of equal importance is the avoidance of over-fatigue of body or of mind, but although excessive exercise followed by over-fatigue is bad, moderate exercise, such as walking or golfing, by improving the general tone is beneficial. It is supposed by some that horsemen are unlikely to suffer from enlargement, but in my experience riding is a bad form of exercise for those who have already shown signs of enlargement. So also is motoring at high speeds on roads of uneven surface. Motoring may also be harmful in that it may induce

the patient to refrain from micturating when he feels the desire to do so. Voluntary retention produces a state of congestion of the prostate and is not infrequently followed by enforced retention. For the same reason, long railway journeys in the absence of a lavatory compartment should be avoided. Business activities, if they cause mental fatigue and over-exertion, must also be curtailed.

The enforcement of a strict diet is seldom necessary. A man who has reached the prostatic age and does not know the diet that suits him best is generally a fool. The patient's instinct is sometimes better than the physician's theory, and provided he digests his food and enjoys it, it is seldom necessary to deprive him of what he likes. Alcohol, however, should either be forbidden, or if the patient has long been accustomed to it, taken in small quantities and with his meals. Spirits, heavy beer, and black coffee, highly-spiced foods and the excessive use of condiments are all likely to be harmful. Although large quantities of fluid during the day are advisable in order to flush out the kidneys, a more restful night will be ensured by limiting the amount of liquid taken during the three or four hours before he retires to bed. Gouty patients may with advantage drink alkaline table waters, such as Vichy and Contrexéville.

Drugs are of little use in the direct treatment of prostatitis, although they may be helpful in dealing with complications, such as cystitis. I have used alkalis occasionally when the urine is very acid in the hope that a reduction of the acidity would diminish the incidence of spasm, and some patients have told me that if they take sodium bicarbonate before retiring their nights have been less interrupted by the necessity of micturating. Strychnine and ergot have also been recommended by some authorities in the hope of increasing the tone of the bladder, but whereas these drugs may have this effect they may also have an

influence on the action of the sphincter. The only glandular preparation that I have tried has been prostatic extract. Its efficacy is, however, doubtful, and there is not any direct evidence that the prostate is a gland of internal secretion.

Of greater importance are drugs exercising an influence on the state of the bowel. All gastro-intestinal disturbances have an effect on micturition, whether they be in the nature of constipation or of diarrhoea. It is therefore essential that the bowels be kept in good order. Even in the absence of constipation the use of an occasional cathartic is generally advantageous. As in the case of diet, I am inclined to consult the patient as to the laxative that suits him best, for there is no reason why we should not take advantage of his past experience. Warm enemas sometimes are useful in clearing out the lower bowel and at the same time relieving prostatic congestion. Sir James Barr has stated that practically every case of prostatic enlargement can be improved by giving iodides in conjunction with thyroid extract. I have not any experience of this method of treatment.

#### ELECTRO-THERAPY

Various methods have been employed by electro-therapists in their efforts to deal with prostatic enlargement. The most usual are:—(a) diathermy; (b) X-rays, either in small doses as a stimulant or in large doses as a resolvable of hyperplastic tissues; (c) static wave current for its production of fibrillary tissue contraction promoting drainage; (d) galvanism for its sedative or relaxing effect through the negative pole and stimulating or contracting effect through the positive

The difficulty in assessing electro-therapists' results arises from the fact that they are not in a position to make an accurate diagnosis of the type of prostate they are treating and are inclined to lump them all

together into one group. Consequently, we can never know whether cases that have responded to treatment have been cases of enlargement or merely of inflammation and fibrosis. What is really required is a closer collaboration between urologists and electro-therapists, which, unfortunately, does not yet exist. Before considering the results claimed for electro-therapy, it will be convenient to discuss what are the principles on which they are based. These have been given by J. Curtis Webb and S. L. Mucklow.<sup>2</sup> They are as follows:—(1) The selective action of rays of short wave-length in destroying newly-formed cells and leucocytes; (2) the effect of diathermy in promoting increased circulation in the part treated, (3) the action of the Morton wave-current in causing cellular contraction (histological massage) and thus aiding the increased circulation to get rid of the debris of the cells destroyed by the X-rays

But the authors of this paper have not, perhaps, sufficiently realized, as already pointed out, that there is a dynamic as well as a mechanical factor at work in cases of prostatic obstruction, and that electro-therapy can exercise a direct action on this. By causing contraction of muscle fibre it also helps to empty the prostate of secretion and thus has a direct effect on its size. Whatever our views on electro-therapy may be, it must be confessed that it has been given far less attention in England than on the Continent and in America. Since this article deals with cases unsuitable for more radical methods, it will be convenient to summarize the place of electro-therapy in treatment.

*Diathermy* may be used either alone or in conjunction with X-rays. It probably acts by diminishing sphincter spasm, and when X-rays have been used, by hastening the absorption of tissue debris.

*X-ray treatment* may be given alone or in conjunction with diathermy or static wave. In order to effect any reduction in size of the prostate, massive doses have

to be used. This carries with it a certain danger of injuring the skin and the mucous membrane of the rectum which lies immediately behind the prostate, and I have seen one case in which the rectum was so much damaged that a permanent colostomy became necessary. These dangers, however, can usually be averted by the expert, and if the claims of many Continental electro-therapists are to be believed, some 50 per cent of patients are cured or greatly relieved by X-ray therapy. Several radiologists in this country do not attempt to obtain a reduction in the size of the gland by intensive treatment, but aim only at an improvement of symptoms by the use of smaller doses. They assert that this can be effected even although the size of the gland does not appear to have been altered.

*Galanism, sinusoidal current, static wave, and high frequency* act chiefly by causing contraction or relaxation of muscle fibre. Since in the enlarged prostate the acini are dilated with prostatic secretion and epithelial cells, massage is always beneficial, whether it be effected by electrical means or by the finger. Electro-therapy treatment may therefore offer a good palliative treatment. It can, however, rarely be considered curative, but rather as an adjunct to other methods.

When relief has been obtained, it is important that the patient should be kept under observation so that should an exacerbation of symptoms occur, treatment may be resumed. It is probable that for the definitely enlarged prostate, the best form of electrical treatment consists of deep radio-therapy combined with diathermy, and for the small fibrous type, diathermy combined with the static wave.

#### MINOR SURGICAL PROCEEDINGS

When the amount of residual urine increases, and renal efficiency is threatened, emptying of the bladder becomes imperative. Palliative methods alone are no longer possible, and the patient must be submitted



either to catheterization or else to some operative procedure less drastic than prostatectomy. There are probably few emergencies in medicine that demand greater judgment than does this of deciding what is to be done for a patient unfit for prostatectomy with a distended bladder. The catheterization of such a patient may be the match which lights up a whole series of troubles, for however scrupulous our asepsis, we are bound to infect the bladder sooner or later, and once infected, the condition of the patient rapidly deteriorates.

Statistics show that the expectation of life of a patient suffering from prostatic obstruction and dependent on catheterization is very poor. A few individuals only would appear to tolerate such treatment and escape the danger of renal infection. The prognosis depends on many factors: the ease and comfort with which a catheter is passed, the care and asepsis exercised, the absence of bleeding, and the frequency with which the passage of an instrument is required. The difficulties associated with catheter life are such that other alternatives must be carefully explored. If prostatectomy is out of the question, even when carried out in stages, two possibilities remain: permanent suprapubic drainage and the clearance of a passage sufficient for micturition, by means of diathermy. These alternatives will now be considered.

*Permanent suprapubic drainage*—Since suprapubic cystostomy is a simple operation and can be carried out under a local anæsthetic, there are few patients who cannot be submitted to it. Once the fistula has been established, the patient may be fitted with a drainage apparatus that will keep him dry and allow him a certain range of activity. As in the case of catheter life, his comfort and health depend greatly on the amount of care bestowed on the bladder and the drainage catheter. Many patients who are well looked after live for years in comfort. Others less

skilfully handled develop a cystitis that makes their life miserable and ends in uræmia. Generally speaking, however, suprapubic drainage offers better prospects of comfort and health than reliance on a urethral catheter.

*Diathermy of the prostate.*—The success of this operation depends greatly on the type of prostatic obstruction from which the patient is suffering. If the prostate be small and the obstruction due mainly to the presence of a "middle lobe" or a fibrous bar, micturition may be re-established with the greatest ease, either by "forage" followed by some form of punch operation, or else by "forage" alone. Since I have been interested in per-urethral operations, I have tried most of the techniques that have been advocated, but have come to the conclusion that there is but little to choose between them. What is important is that a proper passage should be cleared and that sepsis following the operation should be combatted. If, on the other hand, the prostate is voluminous, the amount of tissue that it is necessary to remove is so great that forage is not likely to succeed, or if it should, affords only temporary relief.

Since it is the type of prostate that determines whether any form of per-urethral operation will be satisfactory, it is only after cystoscopy that we can arrive at a decision. Should the cystoscopic examination suggest that it will be possible to re-establish micturition, the operation can be carried out satisfactorily under either caudal or low spinal anæsthesia. This brings it within the range of many patients for whom a more serious operation or a general anæsthetic would be out of the question.

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# Retention of Urine and its Treatment

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URINE first passes into the bladder and is retained by the contraction of both the internal and external sphincters. When a certain amount has collected, the pressure suddenly rises, there is a desire to urinate, the vesical muscle contracts, the sphincters relax, and urine passes along the urethra. For micturition to take place normally the muscular and nervous systems must be efficient. Difficult micturition may arise from inability of the bladder to contract, from the failure of the sphincters to relax,

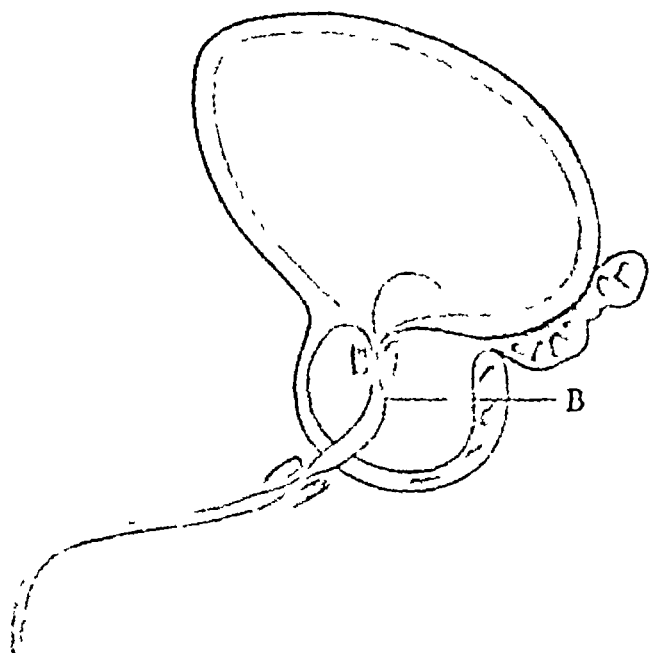


FIG. 1

or from some obstruction along the urethra. The anatomical relations of the bladder and urethra should be borne in mind when trying to ascertain the

cause (Fig. 1). These may be classified as follows :-

*Retention due to atony*—Seen in nervous diseases, such as tabes, and after injuries to the cord. It is also seen in the later stages of pernicious anemia.

*Retention due to spasm*—Seen in hysteria, but more often after operations upon the anal region, the groin or the perineum.

*Retention with obstruction*—*Intra-urethral* (a) Growth of the bladder which can be displaced into the internal meatus, (b) a stone.

*Walls of the urethra* (a) Stricture, (b) rupture, (c) acute gonorrhoea.

*Extra urethral*—(a) Prostate (1) simple enlargement, (2) malignant disease, (3) abscess. (b) Periuethral abscess. (c) Pelvic tumours. (1) fibroids of cervix, (2) retroverted gravid uterus.

This table includes the common causes of retention. The occurrence of retention during the early stages of an acute illness should arouse suspicion of anterior poliomyelitis, it is rare with cerebro-spinal fever and is never seen in influenza. In the later stages of any fever, such as typhoid, when the toxæmia is extreme, there may be atony of the bladder muscle and urine may not be passed. The patient is not mentally alert and may not make any complaint. It is consequently important to palpate the abdomen each morning to make certain the bladder is not distended. After an operation it is advisable to ascertain that urine has passed, as suppression and uræmia may supervene, urine may not be passed owing to a spasm of the sphincter, or the bladder may become distended and no desire may be present if the patient is too collapsed.

When the obstruction to micturition comes on gradually, the bladder-muscle will hypertrophy and the obstruction may be overcome. But there are two dangers: back-pressure on the kidneys may be going on or at any time acute retention of urine may arise. When the general health is poor, when some nervous disease is present, or when symptoms of renal failure arise early, atony of the muscle takes place, the bladder becomes distended and the condition known as chronic retention arises.

Acute retention must be differentiated from chronic

retention and anuria. With anuria the patient may complain that he is unable to pass urine. No urine enters the bladder, either because there has been suppression when there may be an associated cedema of the face, or the only remaining kidney has become obstructed by a calculus when there may be a history of lumbar pain. The patient is quite comfortable and free from pain, but is concerned because no urine has come away. Mentally and physically he may appear quite well and the general condition may be good. On examining the abdomen, the bladder will not be found to be distended. The patient's state is dangerous, for unless the appropriate medical or surgical treatment is instituted he will die.

With chronic retention the patient may appear quite well. The condition is a most serious one and may become dangerous. In all probability the pelvis of each kidney is in the same state as the bladder and there is extensive destruction of renal tissue. Symptoms of renal failure, such as thirst, loss of appetite, and lassitude may be present. The patient usually comes complaining of undue frequency or incontinence, occasionally of difficulty. As a rule he is unaware that the bladder is distended, for there is no pain. It is very rare for a chronic to end as an acute retention. There is no danger of the bladder rupturing, and urgent treatment is not required. If such a bladder be emptied quickly the patient will become uræmic. It is most important that the urine should flow away slowly and that two or three days should be taken to empty the bladder. With acute retention there is always great pain, which may be spasmodic in nature.

#### TREATMENT OF ACUTE RETENTION OF URINE

The most important thing is first to relieve the pain. This must be stressed, because so often one sees the practitioner attempting to make an accurate diagnosis or trying to pass some instrument with the patient

writhing in pain. The pain may lead to exhaustion and is a great strain on the heart. A hypodermic injection of  $\frac{1}{4}$  gr. of morphia and  $\frac{1}{100}$  gr. of atropine should be given immediately. A suppository should not be used; when morphia is given in this way, it does not act so quickly; it does not act more effectively because its action is upon the central and not the peripheral nervous system; as the patient strains down, he may empty the bowel and it is then impossible to know how much of the suppository is retained. After this a suprapubic puncture of the bladder should be performed. Now the bladder must be distinctly felt. The hair is cut away and the skin disinfected with iodine or 1 in 20 carbolic acid. The puncture should be made immediately above the pubes, and the trocar and cannula should be directed downwards and backwards. It is unnecessary to inject novocaine into the skin as the patient is already in so much pain that he will not feel the puncture.

The old curved form of instrument with a large bore is a barbarous instrument. The Genito urinary Manufacturing Co have made this instrument for me (Fig 2). It consists of a trocar and

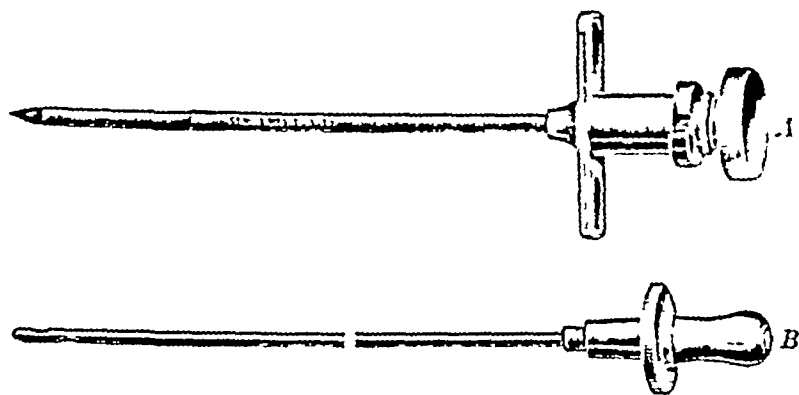


FIG 2

cannula of small bore *A*. When the trocar is withdrawn the small inner tube *B* is inserted, this passes well into the bladder and will do no damage, as it is not sharp, nor will it slip out as the bladder contracts. The cannula may be fixed in position by tape around the body or by two silkworm gut stitches passed through the skin. To the end of the inner tube a piece of rubber tubing is attached

which goes into a bowl lying between the legs. If the urine is coming away too quickly, the tubing may be clipped with the Mohr or burette clip.

It should take about two hours to empty a distended bladder. When the retention is acute, as is shown by the patient being in much pain, it is not necessary to take longer than this. A suprapubic puncture does no damage and the cannula may be left in position for hours without any harm resulting; it may even be repeated. But once it has been done, no great distension of the bladder must be allowed to occur again, or urine will be extravasated into the prevesical space. But it only relieves the patient of the pain and discomfort incidental to a distended bladder; it does not touch the cause of the retention. In the eight hours that will elapse before sufficient urine is secreted to distend the bladder again, the following should be carried out.—(a) the patient is examined and an attempt made to find the cause of the obstruction; (b) everything should be done to get the patient to pass urine naturally; (c) if this does not occur, then it will be necessary to overcome the cause of the obstruction or to drain the bladder suprapublically.

To advise a suprapubic puncture immediately one sees a case of acute retention is opposed to the usual surgical teaching, but it gives the patient immediate relief. There is adequate time for carrying out a routine examination. Catheters and bougies are much more easy to pass with the patient at ease and not writhing in pain. In addition, if this fails, all preparations should have been made to carry out further treatment. In the last two years I have been called to see three medical practitioners suffering from acute retention in whom attempts at catheterization had failed. I immediately did a suprapubic puncture and each expressed his appreciation that this had been done and no attempt had been made to catheterize. After discussing the matter with them, I now do a

suprapubic puncture at once, even when no attempt has been made to pass a catheter; for it does no harm and it is the kindest and most humane thing to do.

#### THE FINDING OF THE CAUSE

The meatus should be examined to see if there are any signs of acute urethritis, and the whole of the urethra should be palpated to find out if there is any thickening, which may be felt when a stricture is present, or if there is the hardening due to a stone. A nodule in an epididymis may be suggestive of an old gonorrhœa. The knee-jerks and pupils should be examined to exclude any nervous disease. A rectal examination is made and the prostate palpated; there may be the enlargement of the soft adenoma or the hardness and irregularity of malignant disease.

From this examination the cause of retention will be found in the majority of cases. If none be found it may be due to a stricture which, as a rule, is not felt on palpating the urethra, to an enlargement of the middle lobe, to a portion of a growth of the bladder displaced into the internal meatus, or to a stone. It is sometimes advised that a urethroscopy to inspect the urethra and a cystoscopy to inspect the bladder should be carried out. Theoretically this is correct, but I am quite definite that immediately after an attack of retention neither should be carried out, for the patient is not in a fit state; he has already suffered enough. The most that should be done is to pass a No. 9 gum-elastic bougie along the urethra. A stricture always forms in front of the compressor urethra and the obstruction will be less than six inches from the meatus. If the bougie passes this distance, no stricture is present.

#### THE PREVENTION OF RECURRENCE OF RETENTION

Every case of retention is associated with a spasm of the compressor urethræ and with congestion, and if these can be relieved the patient may pass urine naturally.



A hot soap enema should be given to empty the lower bowel, and heat should be applied to the perineum and hypogastrium. The ordinary fomentation is useless as it cools too quickly; bath sponges rung out of hot water or hot-water bottles covered with flannel should be used. Keeping the penis in hot water sometimes helps. If the patient be strong and healthy and the pulse good, he should be placed in a hot bath and told to pass water there, but this should not be done with those who are old and decrepit, and especially if there is any suggestion of myocardial trouble, which is so often seen with urinary diseases, as a hot bath puts much strain upon the heart. Morphine and atropine will relieve the spasm, but never give more than one dose as it makes the patient too comfortable and he may then make no effort. After an operation there should be no hesitation in letting the patient get out of bed. I have never seen any harm result, if the wound has been properly sewn up.

If no urine is passed either suppression has taken place or the bladder is slowly filling up, and it will not be long before the retention becomes acute again. It is important to overcome the obstruction before this takes place.

#### CATHETERIZATION OF AN ENLARGED PROSTATE

I nowadays never use a rubber catheter, but prefer the brown gum-elastic, the consistency of which can be made to vary by altering the temperature of the lotion in which it is immersed. Those graduated according to the Charrière scale should be used, as the size corresponds to the circumference in millimetres; a No. 18 Charrière corresponds to a No. 12 English. The English grading varies with the manufacturer, and the jumps between the various gradings are sometimes too big. It is often stated that English gum-elastic catheters and bougies are not so good as the French; this is not the case if they are bought from reliable manufac-

turers There are good and bad French manufacturers, just as there are good and bad English manufacturers, but the best English instruments are better than the best French.

With an enlarged prostate there is no narrowing of the urethra; difficulty comes from the irregularity in outline. This may be due to pressure on either side from the lateral lobe, and this is not difficult to overcome, but more often it is due to the tip of the catheter impinging against the point (*B*, Fig. 1) where the middle-lobe begins. To try to counter this kinking a No. 18 Charrière coudé or, preferably, a bicoudé

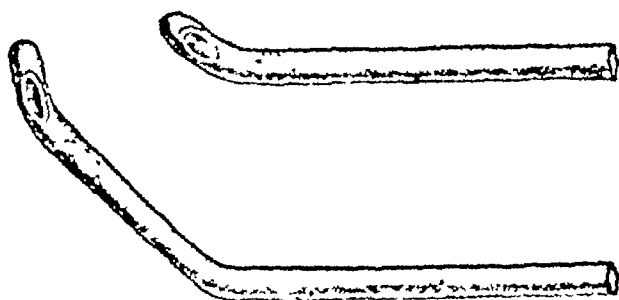


FIG. 3.

catheter (Fig. 3) is taken.

The catheter is held about 10 in. from the tip and, consequently, the part that passes into the urethra is not touched by the fingers. The number of the catheter is placed on the side which faces the direction in which the beak points, and wherever the catheter lies the position in which the beak is pointing can be found. At times the bend in the urethra cannot be passed, when a finger inserted into the rectum may help to lever the catheter into the bladder. One stands on the left side of the patient with the right hand manipulating the instrument and the left forefinger in the rectum. The mistake is made of passing the finger as far as possible and then exerting pressure. This should not be done as it may increase the difficulty by making the bend more acute. Pressure should be made opposite the point *B* (Fig. 1), this can be found by noting the place where the beak presses when the catheter is manipulated by the right hand. If this fails, a stilet which gives firmness to the catheter or the prostatic metal catheter may be used.

If the catheter passes easily, the chances are that it will pass easily again, so it may be taken out. If there

has been difficulty, it is better to tie it in; the reason for this is that the retention is usually due to an associated congestion, and when this disappears in a few days urine may be again passed. A catheter should not be tied in for more than three days at a time as it irritates the urethra. At the end of this time it should be taken out, when the patient may be able to pass urine; if not, the urethra should be washed out and the catheter reinserted. If urine is not passed at the end of six days, then in all probability micturition will not take place again, and the decision will rest between the constant passage of a catheter, prostatectomy, or a permanent suprapubic drainage.

#### STRICTURES OF THE URETHRA

Usually the opening in the stricture is not in the centre but to one side; most often it is towards the roof (Fig 4). One should start with a No 4 Charrière

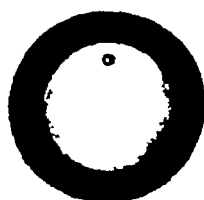


FIG 4

gum-elastic bougie and place a kink about half-an-inch from the tip (Fig. 5); in this way the whole surface



FIG 5

of the stricture can be gone over and the opening is more likely to be met. If this bougie passes, the opening is fairly large and there will be no difficulty in passing a No 5 later; when it is withdrawn, the patient

can pass urine. If it will not pass, a catheter must be taken; should this go through, the operation is probably a small one and there is a fair chance of finding it again. The bougie should then be inserted; in, the urine will trick down by the catheter. At the continuous pressure from the back, the pressure in the stricture will be one far, or, at the end of three days it should be taken out, when urine should come away easily and a No. 1 bougie passed. I do not like the bone and stiff-shouldered bougie and I do not use it as they are dangerous.

If a bougie cannot be passed, the type of operation of treatment will depend upon the type of stricture present the condition of the patient, and the opinion held by the practitioner. Three methods are suggested:—  
 (1) To give a general anæsthetic and to try to pass a small metal bougie; this should only be done if the patient is anæsthetized, as the slightest pressure of the part may lead to a false passage that will last for the rest of life. (2) To do an external urethrotomy.  
 (3) To do a suprapubic cystostomy.

When a stricture gives rise to acute retention, there is bound to be back-pressure on the kidneys and a general anæsthetic may precipitate the onset of uræmia. The operation of external urethrotomy is a difficult one and takes time. It may be difficult to get the wound to heal and the stricture that results is often one of the most difficult to keep dilated. If I fail to pass a bougie, I do a suprapubic cystostomy under a local anæsthetic, this relieves the pressure upon the kidneys and the congestion around the stricture. At the end of seven days the patient's condition will have improved, there will then be no difficulty in passing a filiform bougie, and the operation of internal urethrotomy can be done under a low spinal anæsthetic. The stricture can then be easily kept dilated and there will be no difficulty in getting the suprapubic wound to heal. This method is best for the safety of the patient.

and is most suitable for the local condition.

#### POINTS IN THE USE OF CATHETERS

*Gloves.*—The use of gloves is a refinement. They are unnecessary, as the part of the instrument which enters the urethra should not be touched.

*Local anæsthesia*—Cocaine has a definite action; at times rapid absorption takes place and fatal results have been recorded; it should never be used for urethral work. I have used other local anæsthetics, but am somewhat doubtful of their action; it is difficult to get the solution to pass into the prostatic urethra, which is the painful area. If they are used, they should be injected before the urethra has been irrigated with an antiseptic or a bougie introduced, as an antiseptic destroys the substance and the lubricant prevents its access to the mucous membrane. I have employed local anæsthetics with patients who have had bougies passed for years. They are under the impression that they do relieve to some extent the pain which results from the passage of a bougie; but they are convinced that micturition is subsequently much more painful. I no longer use them for direct application to the urethra.

*Lubricants.*—Glycerin is useless. Oil should not be used as it makes the hands and instruments too slippery; it adheres to instruments and makes their sterilization very difficult if they cannot be boiled. When glycerin is mixed with tragacanth it makes the ideal lubricant. I use the proprietary preparation lubafax, which is sold sterilized in tubes.

*Sterilization*—Gum-elastic instruments are sometimes sterilized in formalin; but even if they are kept for some time in a lotion this is difficult to wash away and irritates the urethra. They are best sterilized by washing well with soap and water, rinsing in running water, and then allowing them to remain for five minutes in 1 in 1,000 oxyvanale of mercury. If not so used and the washing is repeated immediately

after they have been used, sterilization is very effective. The best gum-elastic instruments may be boiled, if this is considered necessary. They should be placed directly into boiling water and at the end of three minutes raised from this by two pieces of tape and placed in cold oxycyanide lotion, but if they are boiled they do not last so long. Bimodide and the perchloride of mercury should not be used as they irritate the urethra.

*Other points.*—The surgeon's hands should always be warm, and the patient should lie flat on the back with a pillow under the shoulders and one under the knees; it is important not to have the patient sitting up. When gum-elastic catheters are used, they should be kept in warm lotion as there is less tendency to give rise to a spasm. With a stricture the obstruction is in front of the muscle, firm instruments are desirable, and the lotion should be cold.

#### SUPRAPUBIC CYSTOSTOMY

If the patient has suffered very much, if he is ill, if there are signs of renal failure shown by thirst, lassitude and dry tongue, if attempts to pass an instrument have been made before and bleeding has occurred, it is better not to try to pass an instrument, but after suprapubic puncture to have the patient transferred to a hospital or nursing home and have a suprapubic cystostomy performed. This is the safest thing for the patient and the kindest.

Under a local anæsthetic an incision is made as high above the pubes as possible and the recti muscle separated. The peritoneum is then reflected upwards and the bladder-wall exposed. A stitch is passed through the upper part of the wound through the rectus sheath, the bladder muscle, and the opposite rectus sheath. This anchors the bladder and prevents it slipping away from the abdominal wall. An incision is then made in the bladder-wall and a right-angled No 26 de Pezzer catheter inserted. If the urine has contained much blood it is better to use a Malecot catheter, as the openings are larger and less likely to become blocked with clot. If there is a possibility of any blood clot being present, the wound in the bladder should be enlarged and the cavity washed out. A tube should always be placed in the prevesical space for drainage,

there is then no danger of the spread of infection

Suprapubic cystostomy is a very simple operation and takes just five minutes. There is no difficulty in the technique. The blind cystostomy by which a de Pezzer catheter is passed after the introduction of a trocar and cannula should never be done. One can never be certain that a distended bladder raises the peritoneum. The further the incision is from the pubes, the easier it is to get the wound to heal. In addition, should prostatectomy be carried out at a later date, with the open operation the wound can be enlarged downwards without any danger of opening the peritoneum.

A suprapubic cystostomy does not, however, remove the obstruction. By putting the bladder at rest and giving ease to the patient, it puts him in the best position for operative treatment at a later date, if this is considered advisable.

#### CHRONIC RETENTION OF URINE

When this is present there is also dilatation of the ureters and the kidneys are being slowly destroyed, though, when some nervous disease, such as tabes, is present, this is less likely to take place. If the chronic retention is not relieved, this destruction will still be going on and the patient ultimately dies of uræmia. On the other hand, when the chronic retention is relieved, the patient may become for a time very ill and may even die of uræmia.

For some time the kidneys have been secreting urine against a back-pressure from the bladder. If this suddenly disappears they are unable to adapt themselves to the changed conditions, and suppression of urine may supervene. The muscle of the bladder and of the ureters has been stretched and is in a condition of atony. While this muscle can always recover its power, it is important that any changes to which it has to adapt itself should be gradually produced. If

the bladder is suddenly emptied the blood-vessels of the mucous membrane are no longer supported, and hæmorrhage takes place into the bladder and, what is worse, directly into the kidneys, and uræmia supervenes. It is most important that the bladder should be only slowly emptied. When this has been successfully accomplished, there is a tendency for the bladder muscle to contract down if continuous drainage is instituted and pressure will be exerted upon the lower end of the ureters and so prevent the excretion of urine. This is probably responsible for the uræmic symptoms which appear about the fifth day. Therefore in these cases the bladder must be slowly emptied, continuous drainage must not be instituted, and as in these cases there is a tendency for sepsis to arise, rigid asepsis is necessary.

Two methods are available: either a catheter should be passed or suprapubic cystostomy performed. It is often urged against cystostomy that with it gradual decompression of the bladder is not possible. But if after the bladder is exposed, a purse-string suture is placed through its walls and in the centre of this a small opening is made for the insertion of the de Pezzer catheter, the operation can be accomplished with the escape of only a couple of ounces of urine. Afterwards as little or as much urine is passed as is considered desirable. During the war I had a considerable experience of spinal cases; if it was necessary to empty the bladder and a catheter was passed, even if the most rigid asepsis was adopted, infection of the urinary tract always occurred and the patient usually died. On the other hand, with a suprapubic cystostomy infection of the urinary tract rarely occurred, and even when it did the patient lived. With this experience behind me I have always preferred to decompress a chronic retention by suprapubic cystostomy rather than by the tied-in catheter.

Either five ounces of urine may be taken away



each hour or the urine is allowed to drip away, a small burette clip being placed on the tube, care being taken that not more than five ounces passes each hour. It is important to have had the patient in bed for 24 hours and to have him nursed in blankets. He should have been given large quantities of water containing glucose and bicarbonate of soda to drink, and injections of digitalis, gr 1/100, four-hourly for the previous 24 hours. In addition, two ounces of blood should be drawn off from the cephalic vein at the time of the operation and daily on five subsequent occasions, unless the blood-pressure is very low. Once the bladder has been completely emptied, the clip should be re-applied three times a day. In this way the onset of uræmia and cardiac failure may be forestalled.

At times it is not easy to decide whether a retention is acute or chronic, and this is particularly the case when it occurs at the end of life. One must be guided by the amount of pain that is caused, and one should remember that such a bladder will not rupture. But no matter what treatment is carried out some patients will die.

When a man is aged and decrepit there may be retention of urine, and it is very difficult to know what to do in these cases, because the expectation of life is so slight. An operation is justifiable if it makes the going out from life more easy; it is not justifiable if it merely prolongs the act of dying. In such a case, if there is no pain, a surgeon should have sufficient courage to leave him alone. If there is pain, a cystostomy may be preferable to the passage of a catheter.

#### CONCLUSIONS

(1) In acute retention the first thing to do is a suprapubic puncture.

(2) In chronic retention there is no need for urgency in applying treatment; the condition has been developing very slowly. It is essential that the bladder should be drained slowly, or the patient may die.

# Some Observations on the Diagnosis and Prognosis of Pulmonary Tuberculosis

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THIS subject has been chosen, not with the idea of putting forward something new, but in the hope that by discussing difficulties already well known, some fresh view-points may be obtained in comparing the attitudes of the general practitioner, the specialist, and the sanatorium physician. As the subject is too big to consider in all its aspects, I propose to deal with the three questions so often asked by the patient:—(1) Have I got tuberculosis? (2) How much disease have I got? (3) When can I get back to work?

(1) *Have I got tuberculosis?* The diagnosis may be simple and evident in the well-established case even to the non-medical observer, but it is often a matter of exceeding difficulty. Two problems must always be considered separately: (a) Has the patient been infected by tuberculosis now quiescent? (b) Do the symptoms warrant a diagnosis of activity? The answer to both these questions can be obtained by putting the doubtful case at rest in bed. The patient who has had tuberculosis and had sufficient resistance to attain fibrosis and cavitation, is very liable to bronchitis. A not uncommon history is one of long-continued treatment for bronchitis afterwards diagnosed by a second medical attendant as tuberculosis, the implication being that the second alone made the true diagnosis. This, however, does not follow, as there are many patients with arrested tuberculosis who suffer from bronchitis every winter, and some of these

will have a relapse and again bring up tubercle bacilli in the sputum. On the other hand, there are undoubtedly cases of active tuberculosis treated under the diagnosis of bronchitis or chest catarrh or influenza, until the disease has reached an advanced stage.

The great criterion in every suspected case is rest, and this applies equally to the early case in its initial stages and to the suspected bronchitic, as no single symptom is infallible and no single test by laboratory or X-rays will entitle the practitioner to make a certain diagnosis in the doubtful stages. It is the accumulation of signs and symptoms that brings certainty and, therefore, rest ought to be the first step in the investigation. By it alone will the fatigue from overwork and the bronchitis in the arrested tubercle be cleared up, and during that rest there will be time to sift the evidence; for example, to make the differential diagnosis of such signs as loss of weight and *neurasthemia*, to find some obvious cause of cough, such as laryngitis from over-smoking, and to study an hourly temperature chart, which will be of great assistance.

If then there is found, with persisting fatigue, a cough that is mainly in the early morning and after meals, and a gradual rise of temperature from 2 p.m. to 7 p.m., with a subnormal reading on waking, the diagnosis of pulmonary tuberculosis must be seriously considered, and the practitioner is failing in his duty to his patient if he does not take two further steps in the investigation by (a) giving the patient a temperature test on exercise, (b) sending him to a competent chest radiologist for screening and film examination, even in the absence of physical signs so slight as deficient movement on one side of the chest.

The exercise test is easily carried out and interpreted. A brisk walk for twenty minutes will produce a rise of temperature in a normal person, but the fall of temperature will be slow in the case of active tuberculosis. A rectal temperature over 99° F. in half an

hour or a pulse rate that does not fall below 90 in the same time, is another indication to the diagnosis of active tuberculosis. Rectal temperatures are best; mouth temperatures are too liable to seasonal variation, and it is not unusual to find a mouth temperature rising on rest, especially during cold weather. It may be well to repeat that the X-ray examination in the doubtful case should be carried out by a radiologist with experience of chest cases. He alone ought to give his observations in suspected early pulmonary tuberculosis and his interpretation on screening alone may be enough to clinch the diagnosis. If he sees a loss of translucency at one apex that does not lighten on deep inspiration and cough, or irregular movements of the diaphragm or mediastinum, the practitioner can add this to his own observations of temperature reactions and rest, and arrive at his conclusions.

In doubtful cases a considerable experience of chest disease is necessary to give a positive diagnosis from films. Many have been labelled tuberculous from the findings of a normal X-ray. The lung reticulations that produce fan-like radiations from the root in city dwellers are not hilum tuberculosis; bronchi and blood vessels when seen in section are often read as cavities and nodules of old disease, and chronic bronchitis is commonly but erroneously called peribronchial tuberculosis. The hilum glands cannot be tuberculous unless there is lung disease which they have drained; they certainly can break down and burst into the surrounding lung tissue, but they are secondary to peripheral disease of some standing.

Sputum and night sweats are not so often apparent in the early case as textbooks would suggest, and they ought not to be waited for as evidence before definite diagnosis. Sputum is commonly absent in the early stages and at first is mucoid in character. Purulent sputum is not an early sign. It is often said by critics of sanatoriums that many sanatorium patients have no

tubercle bacilli in their sputum. Apart from the easily demonstrable fact that advanced disease can be present with negative sputum, it is to be hoped that this will be true of more and more sanatoriums—their results will be better. Positive sputum, like purulent sputum, is a late manifestation of tuberculosis. It is, however, a fairly safe rule, for the guidance of the general practitioner, that three consecutive negative tests of a purulent sputum are against the diagnosis of active pulmonary tuberculosis.

Four points deserve further special attention: (1) a gradual impairment of digestion, (2) a history of fistula in ano, (3) a history of a clear pleural effusion, (4) hæmoptysis not explained by mitral disease. It is surprising how seldom these conditions are considered as evidence of tuberculosis of the lungs. Many patients have been treated for indigestion for years and have been in an advanced stage of pulmonary tuberculosis before the first chest examination has been made. Many examples might be quoted; the following is, unfortunately, only too typical —

A journalist, aged 45 years, had been treated for indigestion for five years, as it got worse he tired of the treatment and sought further advice. Chest examination revealed extensive bilateral disease with large cavitation in both sub-clavicular regions, his indigestion had been secondary to his tuberculosis and consequently had not responded to treatment for such symptoms due to primary alimentary causes.

The same lack of association of ideas is very often present in cases with a history of fistula in ano, which is strong presumptive evidence of pulmonary tuberculosis in a patient with good resistance. A clear pleural effusion means tuberculous pleurisy in so large a proportion of cases that no blame for immediate diagnosis will accrue to the practitioner who makes it. Veins in the throat are still blamed for hæmorrhage, whereas it is a certain sign of chest disease when evidence of a heart lesion is absent. If pleural effusion and hæmoptysis were followed in

every case by a careful routine for two years, the number of patients with positive sputum applying for sanatorium treatment with a history of such symptoms two to three years before admission would be enormously reduced. Should the patient be unable to learn how to apply the necessary routine of rest following work and to attain sufficient self-discipline under his own medical attendant, he should be sent to a sanatorium at once for a short educational stay, as this will almost certainly avoid the long subsequent treatment that is sure to become a necessity in the very large majority who develop easily diagnosed lung lesions.

(2) *How much disease have I got?* It may be noted in the foregoing remarks nothing has been said of physical signs by stethoscope. These are late manifestations of disease, and in the diagnosis of early cases are of much less importance than a careful history and an investigation by rest and exercise. Persistent râles in the upper chest of an adult are certainly diagnostic of tubercle; the few cases one sees of apical bronchiectasis or lung abscess may be discounted, and a film will settle the diagnosis, but it may be well to repeat that such râles are a late manifestation. The most competent physical examiner will fail to find by stethoscope the full extent of disease giving such signs, and most workers in tuberculosis will agree that added sounds made out by them above the clavicle mean infiltration of the upper third of the lung, while signs below the clavicle mean involvement of at least the upper half. X-ray examination and post-mortem evidence bear out this statement. It follows that the failure to make out such adventitious sounds as are present is not such a grave matter as the patient would believe; their discovery and interpretation are not easy, and the specialist has acquired the necessary ability only by long practice, although there is no doubt that they would be heard

much more frequently in the comparatively early stages if they were searched for in the morning rather than during the evening surgery hours, by which time the patient has coughed up or has absorbed what little mucoid sputum is present in the bronchial tubes. It would be better for the practitioner to put the suspected case on bed rest and carry out the physical examination during the round on the following morning. While, however, added sounds are a late manifestation and therefore of little importance in early diagnosis, a much more easily discovered sign will certainly be present—lack of movement from restricted respiration over one lung. Very little practice will bring efficiency in inspection and palpation; eyes and hands are of much more value than ears at this stage of the disease.

Much has recently been written on the need of teaching chest examination to the student who nowadays cannot see a case of pneumonia unless he goes to a special hospital; granted he has a full, even an overloaded curriculum in his allotted years of study, he need not be trained on a specialist basis, some lessons on the application of the observation he has been taught in physical examination in general would repay a hundredfold both himself and the State, and enable him to make a diagnosis while active treatment is yet possible.

This question, How much disease have I got? is a very secondary one to the problem that will exercise the mind of the medical practitioner, who will ask himself the much more important question, What type of disease has this patient got? It is here—in established disease—that the stethoscope is important, and of much more value than the X-ray film. The type of the infiltration is, then, the primary consideration, the extent a very secondary one, a Group I case by the Turban-Gerhardt classification may have a much more serious outlook than a Group III case. X-rays

will generally show the full extent, but they will demonstrate the old-standing lesions, the fibrotic and healed disease, much more than the active and progressive foci: the stethoscope will differentiate these areas.

It was a great disappointment to see in America in 1930 how the film had taken precedence over the physical signs in the management of the case, but probably this was due to a recent campaign on the necessity of installing X-ray apparatus, and the true balance and relegation of values will probably follow soon. A small area, with signs of bronchitic infiltration is much more difficult in prognosis, as much more dangerous, than a well-established fibrotic lesion, and while some consideration must be paid to extent, the diagnosis of cavitation may be of much less serious import to the patient than that of a progressive caseous lesion in one subclavicular region. Two patients were admitted to the Sanatorium in 1924: one had a large cavity in both upper lobes, bilateral laryngeal disease, and a tuberculous epididymis—a case of re-exacerbation of old standing disease; the second had a slight but very active lesion confined to the left upper zone. The first is still alive, the second died within six months. Naturally, such indications as temperature, sputum and night sweats will also influence the decision, but these need no special comment.

(3) *When can I get back to work?* This question is just as difficult as the first. Far too often the diagnosis of tuberculosis has been followed by the magic words "Three months in Switzerland" or "Three months in a sanatorium"; an expert, with years of experience, is never foolish enough to commit himself on the end-result of treatment until he has seen the response to at least one month's observation.

Recently, there was admitted to the Sanatorium a young man with active, progressive disease of a bronchitic type on one side



of the chest. He had been told that he would require six weeks' treatment, but he will be fortunate if the disease is quiescent in six months. His case is by no means unusual.

Such advice is unfair to the patient; it undermines his confidence in his medical adviser, or disheartens him when he finds extended treatment is necessary. On the other hand, while some length of stay in a sanatorium is the best preliminary in a large majority of all diagnosed cases, there are advanced cases and cases of old-standing disease with much superimposed bronchitis not suited to such treatment, granted that attempts are now being made in most sanatoriums to give some comfort, it is well-nigh impossible to temper the wind to such requirements. The physique of the patient must be taken into account in prognosis, and his age will also be a factor of importance, tuberculosis in puberty generally runs a rapid course, the adult type is usually quiet and chronic, while chest manifestations in childhood are hopeless and only evidence of generalized infection. Fortunately, the diagnosis of hilum tuberculosis in childhood is being less frequently made. Hilum glands in childhood are non-tuberculous, and so-called "preventorium treatment" in Canada and America is not a preventive of adult tuberculosis. Weakly children are no more liable to the disease in puberty and adult years than the strong—on the contrary, most histories of sanatorium patients disclose a perfectly healthy childhood.

One laboratory test now a routine in many sanatoriums may be of great assistance in prognosis, namely, the blood sedimentation rate. Without going into details it may be of interest to sum up the results obtained at Midhurst. The normal sedimentation rate of the red blood cells can be taken as about 9 per cent in one hour. A patient whose rate of fall decreases during the first two months of his observation and approximate to this figure of 9 per cent is certainly improving, one whose rate rises or remains stationary

while under good hygienic conditions is unlikely to improve under ordinary routine, and has a bad prognosis unless he is suitable for some active treatment such as artificial pneumothorax. At present it appears that the outlook is better for a patient running a temperature but with a slowly improving sedimentation rate than for one with a normal temperature and a rising sedimentation rate. In one hundred consecutive admissions to the Sanatorium of sputum-positive cases, treated under ordinary sanatorium routine, the sedimentation rate was examined over a period of at least four months, those who left the Sanatorium "much improved" or "arrested," as judged by physical signs, temperature and sputum tests, all showed sedimentation rates falling to the neighbourhood of the normal, whereas those who were only "improved" and still had a positive sputum on discharge, had a much less fall, and those who left in a condition "stationary" or "worse" showed a rising sedimentation rate. It would appear, therefore, that this test is an extremely helpful guide as to the activity of the disease and, therefore, to the prognosis in length of treatment and its ultimate result.

Another factor which cannot be over-emphasized is the temperament of the patient, some years ago Sir James Kingston Fowler said that no fool ever recovers from tuberculosis. The patient may be no fool in art or literature or at his own work, but if he is a fool over his treatment he will never work out his own salvation and is his own worst enemy.

Three years ago a young medical practitioner with active disease in one upper lobe was advised to undergo strict sanatorium routine and, if necessary, to submit to artificial pneumothorax, he elected to carry out his own regime, played golf, and had what he considered open-air treatment for three months, as he had heard of others who had so cured themselves, when seen at the end of that period he had active bilateral disease and was running a high temperature.

Play has killed more tuberculous patients than work has ever done. Doubtless some patients find the

necessary rest treatment very irksome, others become so introspective that they worry themselves to the grave, but the worst type in prognosis are those without any self-control and intolerant of discipline. They cannot realize that 75 per cent of their future is in their own hands, and that a carefully applied routine of work and rest will enable the vast majority of chronic adult sufferers to attain at least a quiescent stage and a capacity to lead a useful, if limited, life. The patient with moderately advanced disease who is thus prepared has a far better prognosis than the earliest case ever diagnosed who is not minded to submit to the hard school of limited activity along sanatorium lines. On the other hand, idleness is not synonymous with cure, and during the necessary treatment work or occupation must be found for the patient, and this has to be graded and applied according to the needs of the individual, so that he may be protected from the loss of will to work, which gives rise to the loafing and idling too often cast up by its critics as the end-result of sanatorium treatment.

No one routine can be applied relentlessly to every type of patient; his training mentally and physically, his social standing and the home and working conditions to which he will return must be considered during his treatment, as the one object of such treatment is to teach him how to live and work healthily. Once he has attained the capacity under observation to do an amount of exercise or work equivalent to that required of him at his daily occupation, his return to work ought to be ever before his medical adviser. His temperature and pulse reactions to such movement should be normal and, if possible, his sputum should be negative as the after results are enormously influenced by this factor. But there is an economic side to this criterion of fitness, and there is no doubt that a properly trained patient, one who has been taught how to rest following his duly exertions at work,

may lead a comparatively long and useful career under modern conditions of an eight-hour day, even if he has attained only quiescence and not arrest of his disease. The conscientious patient on such lines is better at work; he will be going on the best line to attain complete arrest of his disease.

With regard to the patient's future employment: he should return to his own work. His prognosis depends on it. There are very few occupations that can be proved to be conducive to tuberculosis or harmful to those who have had the disease. Far too often a patient is advised to change his occupation as it is necessary for him, he is told, to lead an open-air life in the future. Clerks are too often advised to seek what is called open-air work. Their own occupation, as sedentary, is far less dangerous for their future. No one has a more arduous job, from the fatigue point of view, than the farm worker, the insurance collector, and the commercial traveller, who follow the so-called open-air callings. Further, two factors are to be borne in mind. Thousands of able-bodied, non-tuberculous men are looking for work; those who have suffered from pulmonary tuberculosis have no chance in the competition; again, a new type of work brings but added conditions that will fight against any benefit accrued—the mental worry of learning a new trade or profession, and the lowered social conditions consequent on smaller earning capacity.

# Chronic Ulcers of the Legs

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**C**HRONIC ulceration of the skin is confined to one region of the body, namely, the lower two-thirds of the legs. Ulcers on other parts of the body, provided that they are not of a malignant or syphilitic nature, heal up without incident, but the ulcer of the leg may persist for any period of time up to half a century. The factor which militates against recovery from trauma to the skin in this area is that of inadequate venous drainage due to the vertical distance which the venous blood has to rise in order to get back to the heart. Nature has provided a mechanism for the raising of this venous blood against gravity. Into this mechanism enter many components, of which the following are the most important.—

(1) The valvular traps in the veins of the leg; the valves are arranged in no haphazard way, but are strategically placed so as to shepherd the blood up the leg.

(2) The tone and contractile power of the venous musculature are very important factors, because if the veins dilate too much, the valve flaps can no longer meet, and incompetency develops and a vicious circle results.

(3) The muscular contractions of the leg muscles play a large part in "milking" the blood up the leg.

(4) The rise *à tergo* from the capillary bed.

(5) The elasticity of the skin supporting the superficial veins.

(6) The aspiration due to respiratory changes in intra-abdominal and intra-thoracic pressure.

Any interference with these essential factors will result in venous inefficiency; the effect of gravity will

not be satisfactorily overcome and venous stagnation will result, and in its train will follow all the well-known complications in the lower part of the leg. I have called these "gravitational conditions," and the ulcers "gravitational ulcers," because gravity is the one factor common to all of them. The terms usually used are not comprehensive and are sometimes misleading and irritating, as in the case of a "varicose" ulcer without any varicose veins. Stated briefly, the evils in the leg arise from a breakdown in the circulatory equilibrium which normally exists between arterial and venous systems.

A study of the sites in which gravitational ulcer develops not only confirms the gravitational theory, but also provides us with the method of prevention and cure. In Fig. 1 the density of the shading indicates the relative frequency of the occurrence of ulcer, and it is to be observed that ulcers are most common in the lowest part where the effect of gravity is at its maximum. The figure also demonstrates that ulcers do not occur under shoe or boot leather, and therefore the extension of this support is the keynote of prophylaxis and cure.

The venous inadequacy may arise from a number of causes which are arranged in the order of their frequency:—

(1) Valvular incompetency arising from inherited defect and occupational strain or from destruction of the valves by phlebitis. (A thrombosed vein may be re-canalized in a most remarkable manner, but Nature will never re-endow it with valves.)

(2) Venous blockage from thrombosis. It must be noted here that ulcer may, and mainly does, develop ten to twenty years after the "white leg," and is then probably due to the greater circulatory embarrassment resulting from the incompetent and dilated veins resulting from re-canalization of thrombosed veins.

(3) Increase of intra-abdominal pressure resulting

from pregnancy or abdominal tumour.

(4) Absence of muscular contractions in the leg from infantile paralysis, ankylosis of the hip, knee or ankle joints.

(5) Excessive stature or obesity.

(6) Presence of much scar tissue in leg or thigh, the result of past sepsis, extensive laceration or fractures.

However it arises, the effect of this venous incompetence is to load the leg with venous blood and œdema fluid charged with katabolites. At first, nightly recumbency removes these, but later this is insufficient, and the condition progresses insidiously until the nutrition of the tissues becomes affected and degenerative changes appear in all the leg tissues from the bones to the skin. The bones show rarefactive osteitis and extensive periostitis; the muscles, brown atrophy, ossification and calcification; the fascia and aponeuroses, calcification; the subcutaneous fat, fibrosis and even ossification, the skin, loss of hair, eczema and ulceration, and the veins phlebitis and periphlebitis.

It is surprising that, with the whole of the leg tissues so damaged in advanced cases, any return to function can be looked for after healing of a long-standing chronic ulcer, but very useful limbs result, and can be kept healthy if the circulatory equilibrium is restored and maintained.

*Diagnosis of gravitational ulcer of the leg*—It is most important to realize that no ulcer coming under this head occurs outside the area shown in Fig. 1. This is of great diagnostic importance. If ulcers show no tendency to heal by the method outlined below, then they are either due to cancer, syphilis, soft sore, sporotrichosis, epidermophytosis or X-ray burn. In the first case biopsy is most important, and, strangely, nearly always omitted; in the second the history and blood examination help; in *ulcus molle* the history and presence of inguinal scars indicates the cause. In sporotrichosis the disposition of the ulcer along the

lymphatics is characteristic, and in epidermophytosis



FIG. 1—The shaded areas indicate the frequency of ulceration. *A* is the upper limit, and the lower limit *B*, corresponding with the upper level of the shoe, is a little higher if boots are always worn. A few ulcers occur at *C*, when shoes with an instep strap are worn.

the “ring-worm” nature of the lesion is evident and the extraordinarily rapid variations in the disease.

#### TECHNIQUE OF TREATMENT

Very rarely the patient may present on the first attendance a recent septic abrasion of the leg with femoral lymphadenitis and temperature. In such a case it is best to foment the lesion and let the patient lie up until the active sepsis has subsided. In the usual case a long-standing ulcer is present and a history can be obtained of long-standing varicosities, or of a puerperal, post-operative, typhoid or pneumonic thrombosis. Some particular type of injury, the dye from the stocking, or other reason may be given for the commencement of the ulcer. Occasionally the scar of an operation for varicose veins, or an injection



leakage, provides the starting point for the ulcer.

Before commencing the treatment it is well to explain the rationale of the treatment to the patient, who usually has been vainly seeking for years, inside and outside the profession, for the magic healing salve which will end the trouble for ever, and a method of treatment not involving regular dressings to the ulcer may not be tolerated because it is not understood. It is well to tell the patient that although as a rule the pain will be relieved even to an almost miraculous extent, that there are cases in which for a time the pain may be increased for a short time. In the latter case aspirin and sleeping-powders may become necessary. It is very necessary to gain the patient's confidence, because long years of ineffective treatment will have left a very sceptical frame of mind.

It is well to measure the girth of the leg and the area of the ulcer at the start, and in hospital work the volume of the leg may be estimated by a water displacement method. A photograph is an excellent record if it can be obtained, and I have on occasions made a plaster cast before and after treatment, such as is shown in Fig. 2.

A piece of thin tape is now laid along the front of the leg and longitudinal strips of elastoplast laid along the sides, and in very oedematous or extensively ulcerated legs over the shin and the tendo Achillis as well. Over these strips the leg is firmly bandaged from toes to popliteal space with a spiral of elastoplast bandage. It is essential that nothing should be placed on the ulcer in the way of a dressing or application except in very painful cases, when aspirin powder (not crystals) dusted on the ulcer helps considerably. The bandage is applied, as a rule, just as tight as it is possible to put it on. This is generally done to the accompaniment of considerable protest from the patient, who, as a rule, has regretted a mental decision to remove the plaster as soon as she gets out of sight. A few steps in the supported leg alters the patient's decision, the firm grip on the swollen leg is agreeable, and in the majority of cases the comfort produced prevents the patient to sleep soundly the first night.

It should be noted that there is no preliminary cleaning of the ulcer, no matter how dirty it looks. Before leaving, the patient is told five things:—

(1) To return at once if the bandage is causing

severe pain. (2) To take aspirin tablets if there is difficulty in getting sleep. (3) To regard with satisfaction the appearance of a free discharge between the



FIG. 2.—Plaster casts made at seven weeks' interval of a case of ulceration of twelve years' duration with elephantiasis of the foot. Had resisted all treatment, but with elastoplast bandaging and "insert" skin grafting it healed smoothly in seven weeks.

turns of the bandage, and either to remove this with a sponge and water or to bandage some wool on the ankle to soak up the discharge. (4) To place 6 inches of books under the bottom legs of the bed. (5) If she is a hospital case, to bring a pair of scissors at the next visit and remove the bandage on arrival.

The second visit is generally a week later, but in the case of difficult or apprehensive patients it is well to examine them daily for a few days till they settle down to the novelty of the treatment. Occasionally in a very large ulcer the bandage may become macerated and require removal at three-day intervals at first. On the second visit the bandage, which was the tightest possible fit when put on, is now found to be fairly loose, and can be removed easily by pulling on the tape so as to pull the bandage away from the skin, and cutting along the line of the tape. As a rule a very considerable improvement in the ulcer will be observed at this early date, and the appearance of these changes will enable one to assure the patient that cure is going

to result. The changes seen will be in the leg itself, which will have lost a lot of its induration, and the ulcer will now be shallow where it was deep owing to the œdema being squeezed out of the callous edges, and the floor of the ulcer will be covered with firm, pink granulations in place of the sloughy base of a week previously. The bandage is then reapplied as before, and so the process is repeated until the ulcer is healed.

The healing of the ulcer should not be the signal for such premature rejoicing that all treatment is abandoned and the patient allowed to go free. The support must be maintained for a length of time dependent on one's ability to restore circulatory equilibrium to the leg as shown by the ankles losing their tendency to swell. In certain cases of very much damaged legs the support must be maintained for a very long time, but in the majority, adequate treatment of the varicose veins by injection will prevent recurrence.

Skin-grafting is a valuable adjunct in many cases, usually in ulcers of large extent. The old methods of Wolff, Reverdin and Thiersch grafting have no place in the treatment; they involve leaving large raw areas, and necessitate hospitalization. Pedicle grafting is a totally unjustifiable procedure and always leaves the patient worse off than before. The following technique is used:—

A strip of forearm skin is anesthetized and then fixed with three or four hypodermic needles (No. 16). The piece of skin with the needles is then pinched up with Sims forceps or the special forceps

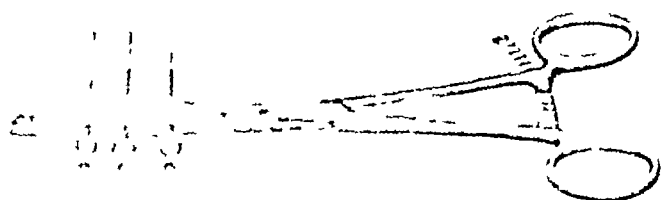


FIG. 3.

made for me by Messrs. Deane & Son, London (Fig. 3). The whole thickness of the strip of skin is shaved off and the wound closed by passing thread through the small needle holes. The piece of skin is

then cut up into  $\frac{1}{2}$  in. squares, and the corners turned obliquely into the ulcer so as to be buried under the layer of granulation and out of sight. Without any further ado the leg is bound up with elastic band in the usual way, and the patient goes away for a week. After seven days the grafts will be seen to be firmly attached and in fourteen days growing luxuriously. This type of grafting is associated with the name of Braun, and it is of the greatest value.

In larger ulcers threads of skin may be darned into the ulcer, and Messrs. Down Bros. have made me a special stencil for cutting these threads. Possibly, this being a longer procedure, a few days in hospital may be advisable. The great advantage of the sub-granulation method of skin-grafting is that no special dressings are required and the adhesive strapping treatment need not be given up, and the patient remains ambulatory.

*Injection of varicose veins*—This is a very necessary corollary to the treatment by support in order to render the cure permanent in those cases in which the ulcers are due to varicose veins only. The successful injection of varicose veins calls for a good deal of experience and judgment. I do not think that any special equipment in the way of syringes with needles set at an angle and glass windows are in any way necessary. They will not make good any deficiencies in skill, and I have even found them a definite handicap. The ordinary record 2 c cm. syringe should be used, and No. 16 Summit needles, these needles do not slip off the syringe nozzle under pressure and, moreover, they are made of steel and may be sharpened with a needle hone, such as is sold by Messrs. R. B. Turner & Co. I do not approve of any of the empty vein methods. I never use a tourniquet or inject with the patient standing, or get the patient to change from the standing to the lying position after the needle has been inserted, for these methods are clumsy and lead to leakage and necrosis. The main points in technique are the following—

(1) Use 1 c cm. of 5 per cent. sodium morrhuate for the initial injection, and use 2 c cm. injections on future occasions, provided

the first injection does not produce an excessive response.

(2) Commence injecting in the thigh and work downwards. This is a most important point, because the lower part of the leg is *locus minoris resistentia*, on account of the veins above, and if these are first dealt with the lower injections will be safer. Further, the blocking of the veins above cuts off the downward flow and so fewer injections will be required below. A leakage below will lead to a chronic ulcer, whereas a necrosis above the knee will always heal.

(3) Inject in the sitting position. Veins which can only be injected with the patient standing or hanging from a trapeze are not worth injecting.

(4) Use a sharp needle. Short bevels or needles with lateral holes are undesirable, they only increase the dangers of injection. The needle should be sharpened by laying it in a groove in the edge of the table and drawing a hone lightly over the bevel. Irregularities on the shaft should be removed with the finest emery cloth. With a perfect point injection is very easy, with a blunt point it is very difficult. With the buffeting that needles usually receive the points always become turned over or the cutting edges rusted. I always examine the point with a magnifying glass before injecting to be certain that it is perfect and will not inflict unnecessary pain.

(5) Inject all obvious varicose veins before discharging the patient as cured and see the case again in three months, so as to inject any veins that have been missed. It is essential to be thorough in this respect or disappointment will be the result. Oedema will often hide veins and should be expressed with bandages to bring the veins to light.

(6) Treat a necrosis as soon as it threatens, as if it were an ulcer, with an elastoplast bandage. It will then heal out of sight and will not be an eyesore to the patient and a reproach to the surgeon for ten or more weary weeks. The bandage may be left on for a month while separation of the slough is taking place and the resulting ulcer healing over.

(7) Treat painful indurations in the same way, provided they are not so high in the thigh as to make strapping impossible.

(8) The rare ascending phlebitis, which occurs most frequently in old ladies, requires rest in bed and cooling lotions for a few days.

**Ligation of veins.**—If large veins fail to thrombose I do not use large and dangerous doses of the sclerosing fluid, or mixtures of sclerosing fluids, or change the solution used, but, instead, proceed to one or more ligations of the veins.

The highest prominent vein is chosen, and through a small transverse incision the vein is exposed (Fig. 4), using the vein retractor and stretcher made for me by Messrs. Mayer and Phelps. The vein is then elevated out of the wound on the two prongs on the other end of the retractor (Fig. 5a), and ligated and divided after injecting 2 c.cm. of sodium morrhuate into the exposed vein to "fix" the thrombus which results on each side of the ligation. It is not essential to ligate the vein cleanly without connective tissue or

tributary veins being included in the ligature and a good large stump of vein left beyond the ligature so that there is no risk of slipping of the ligature. The wound is closed by the method shown (Fig 5b)

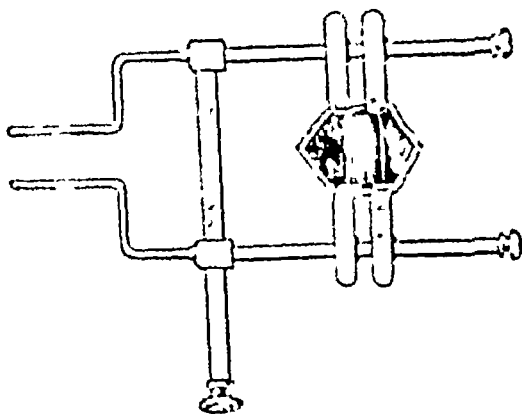


FIG 4

As a result of this ligation injection a very gratifying response is produced in the vein and post-injection pain is greatly reduced, because large thrombi do not

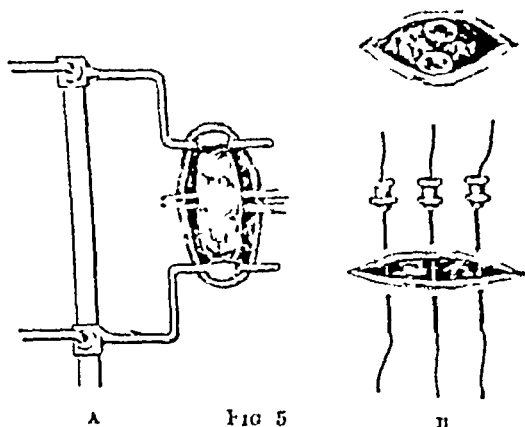


FIG 5

form below the point of division of the vein. Recurrence by recanalization is also precluded.

*Contra-indications to treatment* —When signs of arterial deficiency are noted caution should be observed. I have noted that, when a person who has had lifelong varicose veins comes to the time for gangrene to develop, it is not the toes which go first, but the devitalized tissues where ulcers normally occur. These sloughing areas of skin are not benefited by tight

bandaging. Diabetes is also in severe cases a contra-indication. Dermatitis is a matter of idiosyncrasy. Some individuals cannot tolerate adhesive plaster, as they develop not only severe dermatitis under the plaster, but on the neck, face and forearms. In these cases viscopaste or other form of gelatine bandage will have to be used, or a resin bandage like the klebro. Blistering is sometimes severe and may be caused by idiosyncrasy or uneven bandaging; in a few cases this will make the use of a gelatine bandage preferable.

*Failure of the treatment*—Failure is, as a rule, due to faulty bandaging; the elastoplast bandage must be applied very tightly, and if the ulcer is concealed under the shade of a bony prominence like the malleolus, then extra pressure must be brought to bear on its surface. For this purpose I use onazote sponge rubber with adhesive on one side. It is essential to understand that there is nothing curative in the

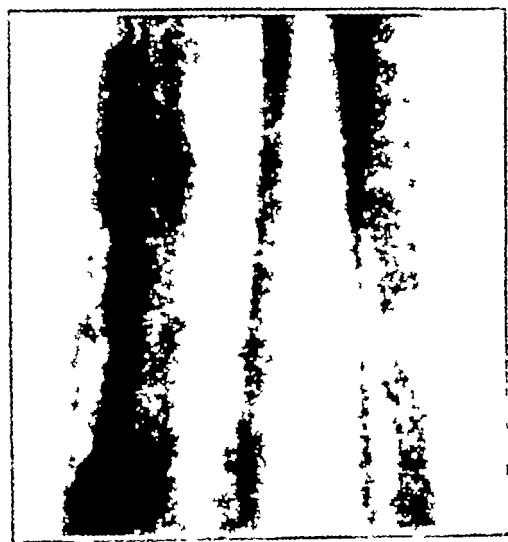


Fig. 1.—Idiosyncrasy of adhesive plaster. The patient is unable to wear adhesive plaster on the lower leg.

bandage, only in the method of application, and the criterion of success is the reduction of oedema and, following close upon this, the healing of the ulcer,

maybe after twenty or thirty years of indolence. Failure to heal may point to an error in diagnosis, and I make a rule in such cases of making a biopsy and an X-ray for erosion of bone (Fig. 6) to exclude malignant disease and the Wassermann test to exclude syphilis.

Recurrence is no criticism of any line of treatment except those of a very painful, expensive or tedious nature. It must be realized that the ulcer is only the manifestation of a disturbance of the circulation of the leg and that this must be remedied to normal before the treatment is finished. Injections nearly always secure this, but in certain cases of deep thrombosis support must be prolonged for a long time. As a rule, when the ulcer is healed and the eczema gone I support the legs for a few months with the spiral elastic stockings as made for me by Messrs Down Bros. It seems unnecessary to stress the importance of making these to the measures taken from a leg made totally free from œdema by the previous bandaging and not allowed to swell again till the stocking is ready to be worn. The fit of the stocking must be perfect before the case is discharged.

By treatment along these lines any ulcer of the leg may be cured and kept cured, and there is no little satisfaction to both surgeon and patient on securing this. It is only necessary to emphasize the necessity of adhering meticulously to the details of the technique and of sticking to one way only of healing ulcers of the leg. The constant changes of treatment which seem to be an established ritual in this complaint have no foundation in reason. Having one good method of treatment, it should be rigidly adhered to till the ulcer is finished with, and temporary setbacks or complaints from the patient should not make one forget the first principles.

There are other conditions of the leg which have a similar etiology and can be treated upon the same lines. Some of these are: (a) tropical ulcer after the sloughs



have separated, (b) syphilitic ulcers of the lower part of the leg which tend to become chronic simple ulcers, especially if the patient has varicose veins; (c) the seasonal ulcers of Bazin's disease in young women of the tuberculous diathesis; (d) Schonlein's purpura, with its intense irritation and abrasion from scratching; (e) The œdema following deep thrombosis or prolonged decubitus.

#### SUMMARY

(1) A method of treatment is described which is ambulatory and permits the patient (if willing) to work during treatment.

(2) The treatment relieves pain instantly in 90 per cent of cases and results in cure in practically 100 per cent

(3) Skin-grafting is a valuable but not an essential adjunct to treatment, and the method used does not require any special dressings or rest in bed

(4) Recurrence is prevented by treatment of the varicose veins by injection and in certain cases by prolonged support

(5) The main essential of the treatment is to bandage the leg very firmly with elastic adhesive at long intervals and allow the ulcer to remain bathed all the time in its own secretion.

# Further Observations on the Electrophonoid Treatment of Deafness

BY MACLEOD YEARSLEY, F.R.C.S

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HAVING now employed the electrophonoid method of Zünd-Burguet since the year 1925 in the treatment of over 200 cases of deafness, I am able to give a more decided verdict upon its efficiency than when I contributed my first article to *THE PRACTITIONER* some six years ago<sup>1</sup>. I propose, therefore, to give a brief analysis of the first consecutive two hundred patients treated, drawing special attention to a few outstanding cases, and ending with the conclusions I have drawn from my experience.

In the following table, which shows the various conditions in which the method was employed, I have divided the results into three classes: Successes, Partial Successes and Failures. The last were absolute "dead" failures, cases in which no result whatever was obtained after the preliminary fifteen treatments. These number 12·5 per cent, which is really higher than it should be because it contains cases treated at their earnest entreaty and which I should absolutely refuse to undertake now. To these I shall have occasion to refer later. The second category, the "partial successes," include those in whom the improvements obtained after thirty or fifty treatments were too small to be of any real value. Such were cases in which voice-hearing was increased a few inches only, say, from six to twelve inches. They were merely *succes d'estime*, and in some of them I am of opinion that a prolonged trial of the method would have given more practical

results. They do not include cases in which tinnitus was relieved without amelioration of deafness, because this result was of great service to the patient.

I would emphasize from the outset that in no case has the method ever made the hearing worse. It is true that during the treatment the hearing is sometimes dulled a little, but this effect is transitory and usually disappears in twenty-four or forty-eight hours. The use of too great an intensity, however, may induce tinnitus, which subsides as soon as the intensity is corrected.

	Successes	Partial Success	Failures	Totals
Born deaf . . . . .	2	—	—	2
Syphilitic deafness . . . . .	—	—	1	1
Mumps . . . . .	1	—	1	2
Presbycusis . . . . .	32	—	—	32
Gun deafness . . . . .	1	—	—	1
Influenza . . . . .	5	—	2	7
Malaria . . . . .	1	—	—	1
Chronic middle ear catarrh				
Unilateral . . . . .	1	—	—	1
Bilateral . . . . .	58	6	1	65
Results of acute catarrh . . . . .	9	—	—	9
Results of suppuration . . . . .	10	—	2	12
Otosclerosis . . . . .	10	2	1	13
Toxic deafness . . . . .	20	8	17	54
	159	16	25	200
Percentage . . . . .	79.5	8.0	12.5	

I propose to take the conditions above enumerated *seriatim*.

*Born deaf.*—Both these patients were young women in whom education on the oral system had developed latent hearing. In both cases this latent hearing was further developed and its distance increased by a long course of the electrophonoid treatment. I think that, in such cases and in other cases where the deafness is not complete, the method should be given a trial.

*Syphilitic deafness.*—M. Zünd-Burguet has expressly stated that his method is useless in all forms of syphilitic deafness. This one case was undertaken only after repeated urgent pleadings by the patient and his

mother, who had brought him from South Africa to see me. The failure was inevitable, and it is hardly fair to include it among these cases.

*Mumps*—The two cases here noted are instructive, as they illustrate the paramount importance of the *immediate* treatment of this rare complication of mumps. In both cases the type of deafness was internal ear:—

One, a girl of 15, had been deaf in the right ear for four years, following an attack of mumps. She was brought to see me from India. Although I pointed out that the chance of improvement was extremely slender, seeing the length of time since the onset, the electrophonoid method was tried at the urgent desire of the mother. There was no change whatever.

The second case was a lady, aged 39, deaf in the left ear. Treatment was commenced a fortnight after the onset of the deafness, and hearing for the conversational voice rose steadily from 28 in. to 17 ft. during fifty sittings. The improvement has been maintained for over four years.

*Presbycusis*—The effect of the treatment upon age-deafness has been remarkable. In thirty-two cases there has not been one failure. Such result can be easily understood when it is remembered that the vascular supply of the internal ear is a circulatory “backwater” and that the effect of the electrophonoid massage by sound (the appropriate stimulus for the ear) is to establish an active hyperæmia with consequent improvement in nutrition. Of course, the earlier the cases are tackled the better the results, but even in advanced age-deafness the improvement was marked. The cases that had not yet lost whisper-hearing gave the best results. Thus, a patient went from 15 in. (whisper) to as many feet, and improvement from 7 ft. to 15 ft. was common. Where whisper-hearing was lost, there was always good improvement for conversational voice, even to the amount of double or treble the hearing before treatment. Thus, one increased from 3 ft. to 9 ft., another from 3 ft. to 15 ft. The length of time the improvement lasts is variable, depending largely upon the patient's condition; the Indian colonel with scarlet countenance and a penchant

for "pegs" does not keep it as well as does the careful and less convivial old gentleman who is studiously inclined. When the improvement wears off, however, it can usually be restored by further courses of short duration. Most patients are so alive to their effects that they are willing to take such short courses of ten or twenty sittings once or twice a year. Of course, there are some who neglect to take advantage of this, and these are mostly women. There are always foolish people who let things slide from sheer inertia

*Gun deafness* is known to be a very intractable condition, easier to prevent than cure. I am glad to have the opportunity to mention one case in which the electrophonoïd was tried. In this, a hearing whisper of R. 12 ft, L. 6 ft., has been restored to 15 ft and 12 ft. This patient finds it wise to take a short yearly course as a "refresher."

The *influenza* cases were all catarrhal. The two failures were both women, elderly, showing chronic toxæmia, and deaf for years. Of the five successes, one was "caught early" and recovered completely. The improvement in the remaining four were: (1) R. and L. 32 and 42 in. to 20 and 15 ft; (2) 40 in. to 12 ft; (3) 6 in. to 10 ft.; (4) 15 in. to 15 ft. Two of these cases find it well worth while to have short yearly or half-yearly courses.

*Malarial deafness.*—This one case had originally been under the care of M. Zünd-Burget. I gave her a short supplementary course while she was in England, raising her voice hearing from 6 ft to 15 ft.

*Chronic middle-ear catarrh*—In one unilateral case of a year's standing the whisper-hearing was improved in fifteen treatments from 8 ft. to 15 ft.

Of the bilateral cases, the one failure had been deaf for twenty years. The *succes d'estime* were all cases of long standing in which the voice-hearing had been reduced to inches. The results were: (1) 20 became 34;

(2) 3 became 27; (3) 3 became 18; (4) 7 became 16; (5) 20 became 33; (6) 10 became 35. It will be noted that in one case the hearing was doubled, in one trebled, in one sextupled, and in one increased nine times. But a gain even of nine times is not much when the measurement is in inches, and deaf people are never thankful for small mercies. Probably, if these persons persevered they would have found it worth while. I base this opinion upon two examples, both ladies, who elected to continue treatment for two years. The first, aged 45, and deaf for twelve years, gradually progressed from 2 ft. to 15 ft. The second, aged 36, has improved from 1 ft to 14 ft.

In all these cases of chronic middle-ear catarrh, two factors are of great importance: age and duration of deafness. Youth and recent onset give the best prognosis. Every otologist of experience who has used the electrophonoïd method has noted its great success in juvenile cases. I would quote three such here and others will be noted under other headings. All three had had tonsils and adenoids removed, had been given up as hopeless and education on deaf lines recommended. The electrophonoïd results were as follows: (1) whisper R. 14 in., L 5 ft, became R and L 20 ft.; (2) voice R. and L 30 in, became 15 ft; (3) voice R. 45 in, L 5 ft, became 15 ft. These results have remained permanent for from four to five years and the boys are holding their own quite well in public schools.

*Results of acute middle-ear catarrh.*—The nine patients were all cases of deafness due to attacks of unilateral acute catarrh, and the results of the treatment were uniformly satisfactory. The deafness was mostly due to adhesive otitis, probably with intra-tympanic adhesions. It may be noted here that the massage by sound appears to have the same effect upon small adhesions in the ear as massage of a joint has upon those inside or around the articulation. Three cases deserve special

notice :—

(1) Man, aged 21 Malleus fixed after acute attack at 8 Fifty treatments, after which malleus moved normally and voice-hearing improved from 11 in. to 12 ft

(2) Woman, aged 62 Sought help for severe tinnitus following an attack of acute otitis two years before Thirty treatments Voice-hearing improved from 3 to 15 ft, and tinnitus ceased before treatment was finished and has not returned during the four years that have elapsed

(3) Woman, aged 21 Unilateral acute otitis two years before seen Moderate deafness, but troublesome tinnitus, and vertigo that was increasing The latter symptom was the most serious, as she feared to go out alone and attacks were becoming more severe This was the first symptom to be relieved, ceasing altogether after eleven sittings By the end of thirty treatments, the tinnitus had ceased and whisper-hearing had improved from 2 to 15 ft None of these symptoms has returned since the treatment, now five years ago, and the patient has become an enthusiastic mountaineer

*Results of middle-ear suppuration*—The two failures were examples of extensive mastoid operations after scarlet fever. The ten successes all showed old open or healed perforations, with adhesions, and three were old mastoid cases In one of the latter, a boy aged 15, voice-hearing was increased from 5 to 15 ft. A second was a girl of 17, hearing for voice increased from 3 to 6 ft. The third was a man of 35, with double mastoid operations His voice-hearing improved from R 32 in., L 35 in., to R 45 in., and L 136 in. The remainder of these cases all gave good results, the best being a woman of 38, voice-hearing improved from 3 in. to 20 ft. (large perforation, showing adhesions round stapes); boy of 12, 3 to 10 ft.; man of 30, 1 to 6 ft.; and a woman of 44, from 3 to 6 ft

*Otosclerosis*—Some of the results obtained were a surprise to me, and I believe that we have in the electrophonoid a valuable adjunct to the treatment of this *hôte noir* of the otologist Every one of the thirteen cases was an example of the classical condition described in 1904 by Denker, in which the triad of symptoms are deafness, tinnitus, and paracusis Willisii, occurring in young persons who have usually normal drum-membranes with a salmon-pink reflex showing

through them from the inner tympanic wall and who present a family history of deafness. I would point out that, in addition, every one of the thirteen cases was a marked example of chronic intestinal intoxication. With the one exception of a woman, aged 41, in whom treatment made no change whatever, every case showed improvement, although in two it was but small. The most striking cases were the following.—

(1) Woman, aged 22, with history of deafness on mother's side. Malco-ordinated and a chronic intestinal intoxicant. Voice hearing, R 14 in, L 11 in. Seventy sittings of treatment, at the same time her toxæmia was remedied and her co-ordination corrected. Hearing improved to 15 ft. for either ear, and this result has been maintained. In a recent letter she states that she has "forgotten she was ever deaf."

(2) Woman, aged 29. Family history of deafness. Colitis for ten years. Deaf for twelve years. Voice hearing, R 27 in, L close up. Electrophonoïd treatment and intestinal treatment. Hearing improved to R 140 in, L 14 in.

(3) Man, aged 22. Deafness began at 13. Strong family history of deafness and intestinal toxæmia. Voice hearing, R 17 in, L 11 in. After a course which extended over a year at intervals, combined with treatment of the toxæmia, the hearing was improved to R 11 ft, L 4 ft.

Among the otosclerotics were two sisters of a family with a marked history of deafness and intestinal intoxication. The elder was the failure already alluded to. The younger, aged 29, improved from 5 in. to 40 in., i.e. eight times the original hearing. Neither would, however, undergo any treatment for the intestinal condition. Another woman, aged 36, improved in thirty sittings from 10 to 36 in., but was too indolent to continue and never carried out a treatment for any length of time.

To obtain the best results it is necessary that the electrophonoïd and the intestinal treatment should be prosecuted together and the patient must be prepared to persevere with the former over a long period. It is remarkable how few patients, although fully aware that they are doomed to severe loss of hearing, will rouse themselves to tackle the situation seriously. The enthusiastic ones who are ready to help the surgeon reap a good reward.

*Toxæmic deafness*—Under this title is included a number of cases in which the type of deafness varied



between middle and internal ear, usually a mixture of both, but all of which occurred in subjects with auto-intoxication, mostly due to intestinal stasis. None of them were examples of true otosclerosis, although those whose nomenclature is vague and loosely applied might call them so. Some would describe them as "chronic dry catarrh," others as "chronic progressive deafness." They all have two features in common: slowly progressive deafness and chronic intestinal poisoning. The deafness is generally mixed in type, middle-ear characters preponderating in some, internal ear in others. The proportion of males to females was 14 to 40. Of the 17 failures, 4 were men and 13 were women, the average age and duration of the deafness being respectively 44 11 and 17.94 years. Of the successes, the cases which showed most benefit were those who were young, although several patients of middle age derived considerable improvement from the combined treatment of the ear and the general condition. I select the following examples of results:—

(1) Woman, aged 47. Voice hearing increased from 50 in to 204 in. Very bad chronic intestinal intoxication for which treatment was loyally carried out by the patient. The improvement has been maintained for over a year.

(2) Woman, aged 25. Combined treatment resulted in improvement for the whisper from 30 in to 13 ft.

(3) Woman, aged 25. Combined treatment. Voice hearing improved from R 12 in, L 10 in, to R 130 in, L 24 in.

Vertigo was the prominent symptom in the following two cases:—

(4) Man, aged 65. Combined treatment. After thirty sittings, voice hearing increased from 27 in to 66 in. The vertigo ceased after the fifteenth sitting and has not recurred. As the vertigo was his main trouble, he was content with its cure and did not continue the electrophonoid treatment.

(5) Woman, aged 50. Rapidly progressing deafness which removal of toxic tonsils by another practitioner failed to arrest. The right ear grew rapidly worse and increasing vertigo followed. The electrophonoid combined with intestinal treatment was tried. The vertigo ceased at the twelfth sitting and hearing increased from close up to 72 in.

In the following, tinnitus was the prominent and

distressing symptom, hearing being affected but little:—

(6) Woman, aged 64 Combined local and general treatment  
Tinnitus both ears Whisper-hearing R 10 ft, L 15 ft After  
thirty sittings, the tinnitus entirely ceased and the hearing in the  
R increased to 15 ft

There was one juvenile case, a boy, aged 7, in whom a hearing of  
R 8 ft, L 15 in, increased to R and L 15 ft It was not until the  
toxæmia was recognized and treated that great improvement began  
The result has been well maintained.

*Conclusions* —The conclusions to which I have come from the experience of the past five or six years are as follows.—The electrophonoid treatment is a valuable method in a large number of cases of deafness, and its employment is founded upon a strictly rational basis. It is this physiological foundation that makes it successful in presbycusis, otosclerosis and deafness following mumps. Naturally, therefore, there are certain factors which modify its value. Putting aside deafness from the advance of years, *age* has a distinct influence, and juvenile cases usually give the most excellent and enduring results. Similarly, the *duration of the deafness* is another determining factor, and it cannot be reasonably expected that the same success will accrue in a deafness of long standing as in one which has been only a short time existent. In chronic cases in which improvement is shown, both the patient and the otologist must realize that perseverance is necessary if the amelioration is to be increased and to be made permanent, and that when great improvement has been attained, any deterioration should be promptly met by occasional short supplementary courses. In the Menière syndrome the method is of high value, and in tinnitus, if used with care, very satisfactory results can be obtained. The methods of use are fully set out in my "Manual."<sup>2</sup>

### References

- <sup>1</sup> Yearsley, Macleod THE PRACTITIONER, 1926, cxvii, 292
- <sup>2</sup> *Idem* "Manual of the Electrophonoid Method of Zünd-Burguet" London. Heinemann (Medical Books), Ltd., 1927,

# Deficient Arterial Tone: A Factor in Post-Influenzal Heart Weakness

By T. STACEY WILSON, M.D., F.R.C.P.

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**D**URING the height of an attack of influenza the heart muscle may be weakened very considerably by influenzal toxins, and in this event a compensatory lowering of the arterial tone is necessary in order to lessen the load on the enfeebled heart. When, however, the attack is over and the heart muscle is tending to regain its normal vigour, Nature seems liable to forget about the lowered arterial tone, which is allowed to remain much below its normal level. The result of this is prejudicial to the somewhat enfeebled heart, for as soon as the blood-pressure tends towards normal the arterial system becomes over-distended.

Now a weak heart cannot maintain in circulation a large amount of blood, and therefore the holding-up of blood in the dilated arteries will lessen the amount available for active circulation. This deficiency of supply, as well as the relaxed state of the arteries, will mean low blood-pressure and will prevent the heart from maintaining an amount of distension of the first part of the aorta adequate for full circulation through the coronary arteries. Arterial relaxation will also handicap the heart in another way; an undue proportion of its vigour will be wasted in the useless distension of the relaxed arteries throughout the body.

The recognition of this state of affairs, which is very annoying for the patient, is very easy for the clinician; all that is necessary is to study the range of oscillation of the top of the mercury column, or of the needle of

the aneroid, when taking the blood-pressure. At 80 and 90 mm. of Hg the range of movement normally is about 1 and 2 mm., or sometimes 2 and 3 respectively as measured on the scale of the instrument. At 100 and 110 the normal oscillation is 4 mm. If at 90 there is an oscillation of 4, or even 5, with perhaps 3 or 4 at 80 mm. of Hg, there is certainly a condition of arterial over-distension present. Overfilling of the arteries may be due either to a rise in the blood-pressure (such as may result from increased peripheral resistance) or to weakened arterial resistance in the face of a normal blood-pressure.

A further study of the oscillation will at once clear up this point and show whether or not the arterial distension is due to arterial relaxation associated with a normal (or low) blood-pressure. If there be increased peripheral resistance (due to contraction of arterioles or venules) there will be a full range of oscillation at 120 and 130, and probably at 140 mm. Hg also, whereas if the case be post-influenzal there may be only 1 or 2 mm. of oscillation at 120, and 1 or nothing, at 130 mm. of Hg.

If, however, post-influenzal debility is associated with a poor range of oscillation—never exceeding 2 or 2.5 mm. and a low blood-pressure, the heart is probably still suffering from the damage done to its myocardium by the influenzal toxins—a condition calling for the rigorous avoidance of any mental or bodily fatigue and for heart tonics, among which coramine ranks high.

The satisfactory point about the diagnosis of arterial relaxation is that there is a simple remedy at hand which will, in a few days, put fresh life into our patients. Post-influenzal arterial relaxation is due to "habit deficiency of suprarenal secretion," and all that is necessary to break the habit is to give a few three-grain doses of suprarenal extract by the mouth, three times daily, for a few days or weeks as the case

may be, according to the supposed duration of the condition.

It is really extraordinary that a patient may be prevented for six months or more from regaining his normal vigour by an amount of arterial relaxation that will yield in twelve hours to three small doses of suprarenal extract. The following is such a case:—

R K had his blood-pressure taken by me as a matter of interest only as he was anxious to see the working of a new recording oscillogram. There was abnormal oscillation at 80 mm of Hg, namely, 5 mm, instead of the normal 2 mm. Inquiry showed that for the last six months he had not regained his full vigour after an illness, was somewhat lacking in initiative, and was unduly tired with a normal day's work. I had the opportunity of a second observation 24 hours later, so I gave him four three-grain tablets of suprarenal extract to be taken in the course of the next day—prior to my second taking of his blood-pressure. The oscillation figures, taken at this second examination 24 hours after the first, are very striking, and show that the relaxed arteries had fully responded to the 12 grains of suprarenal extract that had been taken during the previous 12 hours.

The figures were as follows:—

#### OSCILLATION GIVEN IN MM

Mm of Hg	.	.	50	60	70	80	90	100	110	120	130
Date . Oct 13	.	.	2	2½	5	5	5½	1	3½	1½	1
Oct 14	.	.	½	1	2	2½	2½	1	2½	1½	1

The diastolic pressure on the two dates was 65 and 70 mm of Hg respectively. The systolic pressure rose as the result of the treatment from 102 to 118 as measured by the appearance of the pulse at the wrist, and from 118 to 122 mm of Hg as estimated by auscultation.

He continued to take the suprarenal extract for some weeks and wrote me most grateful letters with regard to the restoration of his normal vigour which my treatment had brought about.

I could quote not a few similar cases seen during the past two or three years since I first recognized the possibility that arterial relaxation might be a cause of cardiac inefficiency. On going through my blood-pressure records for the last fifteen or twenty years, I find several hundred cases which were clearly of this nature, and I naturally regret that I did not, many years ago, learn their meaning, and how easy it is to cure such cases by means of suprarenal extract.

# Some Common Emotional Disorders

By T. A. HAWKESWORTH, M.B.

THE numerous and divers conditions of chronic ill-health which must be attributed to purely emotional causes are as yet far less generally realized than the interest of the subject deserves, and since it can hardly be questioned, and, indeed, can be abundantly proved—as anyone interested can easily satisfy himself—that, with such a basis recognized and accepted, some form of definite mental treatment affords the only possible avenue by which cure or improvement or mitigation of the severity of the symptoms that have arisen can even be approached, the advantage of bearing such a possibility in mind when causes are being sought for can hardly need emphasizing.

It will come as a surprise to many who have not heretofore taken much interest in the subject to find the number of cases which they will begin to label mental in origin, once their attention has been directed to the facts. A very wide range will be disclosed, from those with obvious lack of self-control, associated with a transparently emotional make-up, through those where emotion may be reasonably suspected as a basis, on to those who, perhaps through the force of long existent mental stress, present a picture simulating grave physical illness, in which the part that emotion has played may be disguised or superficially non-existent, and, further, there will be others whose mental attitude at first sight makes it appear most improbable that emotion has been a factor.

As we continue in our process of labelling them we shall find that the complaints that emotion has given rise to are numerous both in nature and degree.

Amongst them there will be social and occupational failures, a host of anxiety states, compulsions and obsessions, fears of all kinds, and baffling results of mental conflicts, grafted on to widely differing temperaments with correspondingly diversified results.

The mental stresses to which they have been subjected will naturally result in different effects on the timid and diffident to those produced on the sanguine and boastful, the depressed, the self-conscious, and other differing temperaments, while mental complexes will in many instances have arisen whose presence will have to be taken into account, and whose existence will greatly increase our difficulties, and may defy all our efforts, when we come to deal with them.

In fact, there would seem to be no limit to the variety of material which we may chance to encounter. Consequently these cases provide a most interesting study for any medical man who has the necessary time at his disposal and patience at his command, and who will not be deterred by the trouble which will certainly be involved in attempting their exploration.

In dealing with them our ingenuity, as well as our patience, will be exercised to the full, and perhaps sorely taxed, but their complexity alone is intriguing and it may be confidently asserted that, with the exceptions that will be presently named, the results that may be secured by relatively simple means will compare favourably with those obtained in the practice of more familiar branches of medicine.

When we begin to inquire more closely into these cases we can hardly fail to be struck by the amount of misery, suffering and incapacity with which we shall be faced. We shall be obliged to admit that the great majority never get any mental treatment at all, even if they have been afforded the time to state their complaints at all fully, but are in general more likely to be put off with various suggestions of self-help, or of

hygienic or physical measures, admissible no doubt in themselves, were these patients capable of profiting by them.

The usual result is that they leave the consulting-room unconvinced, dissatisfied, and feeling that their case is not understood. They commonly drift from one practitioner to another in the vain attempt to get someone to listen to them, and so eventually become a prey to quacks and charlatans, amateur psychologists, faith healers, and the vendors of patent medicines, while evidently some, unrelieved, will inevitably fall into definitely psychotic states.

It cannot be denied that this state of affairs is rather deplorable, particularly inasmuch as many of the more serious developments may undoubtedly be checked if the case is seen in time, and suitable measures adopted, whilst the milder cases may certainly be expected to recover. Of course, these folk, on the whole, are by no means easy to deal with.

Usually before seeking medical advice they have wearied, exasperated and often alienated their relatives and acquaintances by their conduct, their habits, and their reiterated tale of woe, and they have become embittered and difficult. As a rule it takes a good hour for one of them to unburden himself of what he wants to tell you. What busy practitioner can spare the time for these confidences? In dealing with them we often see human nature in some of its worst and most contemptible moods, as well as in some of its most pathetic, with a substratum of profound unhappiness which sooner or later comes to the surface. It will be found that most are entirely lacking in any power of adaptation, and that their reasoning is apt only to lead them to find fresh causes for their discomfort in the conduct of others. Many, the victims of mild persecutory ideas, are sullen, touchy, and suspicious.

Let us suppose that we have consented to take up



one of these cases and try to enumerate briefly some preliminary essentials which will require to be complied with if the detailed investigation which will be necessary is to succeed in its object. First, the practitioner must have sufficient time at his disposal and unlimited patience at his command, and a normally cheerful disposition linked with a sense of humour added to his knowledge of human nature and its failings and frailties, will do much to lighten his task. Some acquaintance with the writings of the recognized authorities on mental therapeutics, and of the main theories that are held or have been advanced is undoubtedly helpful, and will materially aid his own judgment in selecting the most promising path to pursue in each particular case.

On the patient's side we must first be satisfied that he is possessed of sufficient intelligence and education to appreciate commonsense deductions from facts and explanations of phenomena the proof of which has been worked out and can be demonstrated by examples. Secondly, he must realize, and admit, that there is something really wrong with him, the cure of which is at the moment the main object of his life. If he comes unwillingly and only to please a relative, the case should not be undertaken, as failure would be inevitable. And obviously we shall not place on our list cases of congenitally bad material, with their inevitably progressive deterioration, conversion cases connected with claims for financial compensation, recognizable mental defectives, and those showing definitely established psychoses which are sure to present themselves amongst the others.

We have then our patient before us with a good hour of our time free, and at this first session we invite him to state his symptoms fully and in detail. This, as a rule, he is ready enough to do, if we can make him feel that at last he has found someone who will listen to him. We let him describe his case in his own way,

only interrupting him with questions when his meaning is not clear, and we are careful to note fully all he says. This will not only impress him with our genuine desire to help him, but will also serve as an invaluable check to mis-statements and contradictions that will probably arise later. At the next session we shall ask him to supplement any omissions which may have occurred to him since we first saw him, and having noted these we shall proceed to a careful and detailed physical examination which should be as complete and thorough as it is possible to make it.

At the third and subsequent sessions—as many as may be required—we shall proceed with the investigation proper, i.e. we shall go carefully and methodically into his life history from the time of his earliest recollections. This will be a matter largely of question and answer, and we shall urge him to omit no detail, however apparently trivial or irrelevant, but frankly to tell us everything. Home and school life, childish fears and sorrows, family and social relationships, hopes, ambitions, successes and failures, sexual strivings and contacts, and stresses of one sort and another, and how he has reacted to them. We shall aim at getting a fairly definite mental picture of our patient, and some knowledge of the sort of material of which he is made, and if we have succeeded by a sympathetic attitude and a patient hearing in gaining his confidence we shall get very probably what he has never ventured to tell anyone else.

The importance of full notes of all this as we go along must again be repeated. Our memories will certainly require their aid in counteracting subsequent evasions and denials. This investigation, if systematically worked at, will be found in quite a number of cases to reveal a probable basis for the emotional state, but before so deciding we shall naturally pass all other events of emotional significance under review, with which the history may have provided us.

Having decided, we then turn to the difficult task of bringing the patient to see and appreciate the significance of our discovery. To this we shall, in many cases, certainly encounter resistance if not blank incredulity at first, for most are unwilling to accept the verdict that their symptoms are mental or even nervous in origin. They fancy that such a conclusion is equivalent to their being considered of unsound mind, or at least feeble, contemptible characters. And then unpleasant and unpalatable memories may have been revealed, which, owing to the pain or shame they formerly engendered, have long been dismissed into unconsciousness, and some neurosis, at least more acceptable to the patient, substituted. The patient will therefore be likely to deny strenuously that his symptoms are in any way related to these memories.

In helping him to reach the right view point, on which his relief depends, and to face facts, however disagreeable, we have necessarily to recollect some of the better known mental processes by which these varying types of disorder are fashioned, and their complexity brought about. We shall have to be prepared to explain, in simple language, some of the more familiar mental processes as they are known to-day, and to give examples of the physical effects that may be produced by emotion, and by inviting questions and objections remove any lingering doubts that may be preventing the patient from unreservedly accepting the conclusions put before him. This once secured, the advice we shall have to offer will naturally depend on the conditions that have to be met. With the knowledge of the patient's general make-up which our investigation will have afforded us it should not be difficult to see at what point he has gone wrong through faulty reasoning, misinterpretation of facts and perverted judgment.

Allowing for the mentality of each, so far as we have

been able to sum it up, so accordingly we shall have our directions. It may be a simple revaluation of his own powers and limitations, a new view of past mistakes that is needed, or re-education as to the feelings and attitude of others towards himself and of his right place in his own social setting, or a re-adjustment of family or social contacts, or conditions at present intolerable. To resolve to make the best of what exists, to recognize facts and cease to attempt the impossible. To recognize to what lengths gloomy forebodings or suspicions have led him; and so on. It may take a good deal of persuasion to make the patient get the right perspective, to see how he has deceived himself, and to make a clean sweep of most of his former opinions. Careful study and much tact to hit on the line of reasoning that will most appeal in the particular circumstances, will be called for. But in general it will be found that with the patient's confidence once gained, some such procedure, modified as circumstances or our experience may suggest, will have enabled us to put quite a number in the way of living useful, happy lives in the future, armed with some practical knowledge of how this may be accomplished and maintained. We must be prepared to find some return, from time to time, for further help, but these will usually be found only to require a little further reassurance, and encouragement to fresh and more sustained effort.

Amongst our failures will be those whom we cannot reach by the simple process that has been outlined. It may be that in these the mental stress has been too long existent and a very complicated issue has been evolved. Without doubt the facts as to these cases may in many instances be laid bare by a course of true psycho-analysis, but as this can only be undertaken by those specially trained and experienced in the technique, it need not further be referred to here.

There are some additional facts the recollection of

which will help us to get at the truth of the situation as we proceed. One is that during the investigation we are almost sure to meet opposition, reluctance and a tendency to prevaricate when certain points are touched on. This is useful in that it usually serves to show us in what direction more particular inquiries should be pushed. It must be remembered that in the effort to dispel disagreeable thoughts and conclusions, unpleasant memories, feelings of shame or self-reproach, and the like, the mind is constantly occupied in trying to find a way out by displacing the facts by some more agreeable conclusion or explanation not involving any loss of self respect to the individual, but on the contrary creating a situation in which he may reasonably command sympathy rather than blame. Such processes are often most intricately worked out, entirely masking the real issue. The possibility of such an occurrence having preceded the symptoms complained of must never be lost sight of.

Much has been written about cases that can be rightly labelled neurasthenia and hysteria—their appropriate treatment is mostly well recognized, and they are only mentioned here because some of them will be sure to turn up amongst the others. Cases of true manic-depressive psychosis will also present no difficulty in placing under a suitable regime. Cases of loss of function due to conversion will be detected during physical examination.

Functional affections of the gastro-intestinal and genito-urinary systems are commonly met with. The symptoms, emotional in origin, and perhaps derived indirectly from some far off mental trauma, are usually built up on some hearsay information derived from cases of genuine or supposed disease in these organs amongst relatives or acquaintances. The symptoms are sometimes so severe as entirely to unfit the individual for the common everyday requirements of social life, and they have led to many mistakes in

diagnosis and treatment. Some alcoholics and drug addicts will be found to have adopted their habits in the attempt to escape mental stress, or to enable the individual to temporarily delude himself that he is what he wishes to be, and has never attained to. A known inferiority is often masked by a boastful and aggressive manner.

Some event in the sexual life is often the source of severe emotional disturbance; impotence, sexual incompatibility, unhappy marriages, unsatisfied sexual longing, self-reproach for sexual licence in unmarried girls, dread of the results of long-continued masturbation, or of having contracted venereal disease, may not infrequently be revealed as causes of wholly groundless fears which have been usually grossly distorted in the vain attempt to thereby arrive at mental peace and repose. Even outbursts of acutely maniacal conditions may be found, when the patient is once more approachable, to have been based on fear of some secret, about which these patients feel guilty, coming to the knowledge of their friends.

Throughout we must bear in mind that, as in dreams, the latent content is very different to the manifest content, and the latter seems artfully designed to mislead, yet it is the former that must be reached to secure relief. Fortunately most of these people are eminently suggestible and it is really remarkable what simple and apparently obvious measures for readjustment and removal of difficulties have often been missed, or never thought of by so many of them and by the suitable application of which excellent results can often be secured. But whether the ultimate solution proves difficult or easy, to have drawn one patient out of the morass into which he has fallen provides a satisfaction that seems well worthy of all the trouble which the effort may have entailed.

# Practical Notes

## *The Treatment of Secondary Anæmia*

S Davidson points out (*Medical Annual*, 1932, p 39) that the term "secondary anæmia" signifies that the anæmia is secondary to a definite recognizable cause, no matter how difficult the discovery of the cause may be, in short, the presence of a secondary anæmia is a challenge to our diagnostic skill. While all are agreed that it approaches malpraxis to treat a secondary anæmia without first diligently hunting for and, if possible, treating the cause, it is equally unwise to neglect the treatment of the anæmia while carrying out these procedures. The outstanding feature of this type of anæmia is a relatively high erythrocyte count, with a low hæmoglobin percentage. Achlorhydria is present in most of the cases, and the majority of the patients are women below the menopausal age. Chronicity is the keynote of the history, the average duration in Adamson's cases being ten years. An anæmia secondary to organic disease is extremely unlikely to remain unchanged for such long periods. The essential cause of the anæmia is an iron deficiency consequent on a defective diet and an impaired gastric secretion. Davidson states that Giffin and Watkins, Mettier and Minot, Wiggs, Davies, and others, are all in complete agreement in regard to the ineffectiveness of liver extract in the treatment of microcytic anemias of the chronic hæmorrhagic, chronic infectious, or chronic dietary deficiency type. He himself has also carefully investigated this problem and is equally satisfied on this point. This is a really important contribution to knowledge, since a vast amount of money is being wasted to day by prescribing an active principle which can have no possible action except in anemias resulting from a megaloblastic bone marrow. Mettier and Murphy also show that liver extract has no effect in augmenting the value of iron or whole liver therapy in secondary anæmia. L. J. Wiggs (*Proc Roy Soc Med*, March, 1931, 7) has classified the preparations of iron in order of efficiency as follows: (1) the ferrous salts, (2) the scale preparations, (3) metallic iron, (4) the ferric salts, (5) organic iron. The majority of workers prefer pill form (Bland's pill) or iron and ammonium citrate. If the former is selected it must be a fresh preparation and the pills should be broken up and the material spread on bread as a powder, as a safeguard against the passage of the pill unchanged down the intestinal tract. The latter preparation has the advantage of being taken as a mixture. The minimal daily effective dose is at least twice the pharmacopœial dose—the reduced iron 25 gr., Bland's pill 39 gr., iron and ammonium citrate 60 gr. For the past two years S. Davidson (*Medical Annual*, 1932, p 40) has used the scale preparation in the form of a mixture containing 30 per cent of iron and ammonium citrate, three daily, with excellent results. In cases where there is any evidence of gastric intestinal upset—a full diet and a gastric juice partially improved. S. Maurer, J. Greenwald, and C. Kliver (*Journ Am Med Assoc*, March 26, 1932, vol 1, 195) report of a patient that anæmia in infants, when it is secondary to infection, may be treated successfully by due to a

lack of (1) the mineral element (in iron deficiency) (2) the organic element or (3) the food source, as a determinant factor, to bring about the production of hemoglobin in the erythrocytes and hemoglobin. This lack may be due to a shortage in supplies stored at birth and depleted from the mother in utero or from an insufficient available quantity in the diet. Adams and co. in an exclusive milk diet in young animals (milk anemia) is the form of experimental anemia most easily produced. The anemia in rats and rabbits is due to a lack of a few essential elements in the diet. Steenbock and Hart (*Journal Biol. Chem.*, May, 1928, lxxvii, 707) have shown that iron and copper, the latter in traces only, when added to the milk prevent experimental anemia. Maxam and his colleagues state that it has been found possible to cure the anemias of early infancy by administering a diet of concentrated iron which contains traces of copper. The administration of iron with traces of copper to anemic infants failed to bring about an improvement in blood in about 50 per cent of cases, and 11 cases alone failed in but 37 per cent. The patients in the latter group made significant improvement in blood after iron was added. Also of those infants of the iron series who had failed to make improvements in blood on the iron and copper mixture, those who received liver extract in addition made good gains. C. A. Fisk (*Ann. Intern. Med. Assoc.*, March 26, 1932, xviii, 1047) has carried out a series of experiments on rats with reference to the production of inorganic and organic iron in hemoglobin formation. He has found that in the absence of copper organic iron (hematin) is as ineffective as inorganic iron (ferrous chloride) for the cure of nutritional anemia in rats. In the presence of copper organic iron promotes a partial cure of the anemia in rats, but the regeneration is neither so rapid nor so complete as the recovery obtained when ferrous chloride is used as the source of iron. The hemoglobin content of the blood of rats, which remained at from 6 to 7 grams per hundred cubic centimetres as long as hematin and copper was supplied, increased to 16 grams per hundred cubic centimetres in three weeks when ferrous chloride was added to the diet. The iron content of the liver from the different animals demonstrates that the decreased content of the organic iron is due to the inability of the rat to assimilate the iron present in the hematin molecule.

### *Some Points in Prostatectomy.*

Robert Lichenstern has performed 666 prostatectomies with a mortality of 3.8 per cent. He insists on the importance of the preparation and the pre-operative examination of the patient. Besides the usual examinations for judging the functional value of the kidneys, he gives considerable importance to the increase of indican in the blood, in case of renal insufficiency, indican increases even before there is an excess of residual nitrogen. In those cases in which there is doubt about the value of the renal function, he performs the test of voluntary overwork of the kidneys, by a diet lasting two days, containing a large amount of chlorides, proteins and very little water, the dosages are then begun again, especially blood examinations. As regards the technique of the operation, the author performs, as a first stage, the ligature of the *vasa deferentia*,



under local anæsthesia. Six or eight days later, he performs the prostatectomy in one stage, under local anæsthesia. An important point is the process of hemostasis used after enucleation of the adenoma, the vesical mucosa is sutured to the prostatic capsule, which is taken as widely as possible, either by means of separate stitches, or better, by a circular overcast stitch. A small gauze drain is placed in the remaining opening and the bladder carefully closed except where the drainage tube of cystostomy passes. No lavages are used after the operation. The author only exceptionally uses two stages in his prostatectomies, he reserves it for those cases where the indwelling sound does not improve the signs of infection or renal insufficiency — (*Bulletins et mémoires de la Société des chirurgiens de Paris*, March, 1932, xxiv, 177)

### *The Treatment of Varicose Veins*

F. L. Smith states that the year 1911 marked the beginning of successful intravenous treatment for varicose veins. Linscr observed that injection of 1 per cent solution of mercuric chloride had a sclerosing effect on the veins. This gave him the idea of treating varicose veins, and later he reported having treated 6,000 patients, with a satisfactory degree of success. A few patients did not respond, due to toxicity of the mercury. Hanschell, in 1913, used quinine in a 6 per cent solution, but this did not prove popular. From 1916 to 1918, Sicard experimented with luargol and sodium carbonate in solutions of 5 to 15 per cent. These solutions produced necrosis, and the patients were incapacitated for some time. In 1921, Linscr discontinued the use of mercuric chloride because of its toxicity and substituted a 15 to 20 per cent solution of sodium chloride. In the same year, Nobl reported the sclerosing effect of glucose in solutions of 50 to 60 per cent. Gendreau took up the study of quinine, which had been previously introduced by Hanschell, added a local sedative to the solution, and finally reported on a solution consisting of quinine dihydrochloride, 12 per cent, and urethane 6 per cent. In 1924, Sicard had abandoned sodium carbonate and luargol and reported marked success with 20, 30 and 40 per cent solutions of sodium salicylate. About 1930, Dickson Wright, of London, reported his work on the use of sodium morrhuate in 3, 5 and 10 per cent solutions. At present, therefore, there are several sclerosing solutions from which to choose. Since Nobl brought out the glucose solution many combinations of invert sugar have been placed on the market. Until the advent of sodium morrhuate, however, all of the solutions, with the possible exception of invert sugar, produced sloughs if injected outside the vein. They likewise produced varying degrees of general systemic reaction and local manifestations. Glucose and sodium chloride may give a general reaction following the injection, manifested by sensations of dizziness, faintness, and warmth in the throat. It is advisable, before treatment, to test the patient's tolerance to the drug. This is also true of quinine and urethane, which should be given in a dose of 0.5 to 1 ccm. as a preliminary measure. Manifestations of systemic reaction are bitter taste in the mouth, burning sensation in the throat, abdominal cramps, and possible late reaction of the

menstrual function. Quinine also produces severe sloughs if injected outside the vein. The advantages of quinine are that it does not produce pain at the time of injection, and that it is an effective sclerosing agent. Sodium morrhuate has equally good sclerosing action, and gives no pain or general systemic reaction. In a strength of 3 per cent it is the ideal sclerosing solution for the treatment of stellate or "spider burst" veins. For the usual case, a 5 per cent solution is used. Smarting may attend the injection, but one can be assured that sloughing will not result. If one fails to obtain the desired results with the 5 per cent solution, the 10 per cent solution may be given in the same dosage as the 5 per cent, namely, 2 to 6 cm. In more than 2,000 injections the author has not experienced a slough, and the incidence of recurrence is less with this, and with quinine and urethane, than with any other solution he has used —(*Proceedings of Staff Meetings of the Mayo Clinic, February 10, 1932, vii, 78*)

### *Perennial Hay Fever and its Treatment*

G T Brown says that although perennial hay fever is frequently encountered by the medical profession, it is usually poorly handled, and, as a matter of fact, is looked on by most rhinologists as a more or less hopeless condition. On the contrary, when patients with the perennial type of hay fever are properly studied from the allergic point of view, most of them can be entirely relieved from their hay fever. Hay fever may be due to many different causes, and an exhaustive history is of prime importance in locating the causative factor or factors in the individual patient. Itching of the eyes is a most important symptom in perennial hay fever, as it strongly suggests sensitization to some air-borne substance that produces a conjunctival reaction simultaneously with that of the nasal mucous membrane. The treatment for perennial hay fever may be considered under the headings of palliative and curative. A nasal spray of some light mineral oil, such as liquid paraffin, used two or three times daily, may prove helpful as a palliative. The mineral oil, of course, has no medicinal properties, but acts mechanically to form a protective coating over the surface of the nasal mucous membrane, and is most effective when the hay fever is due to sensitization to some air-borne substance. A 1 per cent solution of ephedrine in oil, sprayed or dropped into the nostrils, combines the well-known shrinking effects of ephedrine on the mucous membrane with the protective and soothing properties of the oil. The curative treatment for allergic hay fever consists of the elimination of the offending substances from the environment or diet, desensitizing injections, or a combination of the two. In other words, the allergic person either has to keep away from the offending material or be made tolerant of it. If elimination and specific desensitization fail to cure the patient entirely of hay fever, some form of non specific protein therapy should be resorted to, and in the author's hands, injections of concentrated peptone extract have given the best results. Injections of peptone seem to be most effective in patients with a constantly subnormal temperature —(*Archives of Otolaryngology, February, 1932, xv, 202*)

# Reviews of Books

*Textbook of Ophthalmology - Vol I The Development, Form and Function of the Visual Apparatus* By W. STUART DUKE-ELDER, M.A., M.D., CH.B., F.R.C.S., D.Sc., PH.D. London: Henry Kimpton, 1932. Pp 1124. Illustrations 1022, including 7 coloured plates. Price £3 3s.

THIS book is an intensely interesting and exhaustive survey of authoritative opinion concerning the position of ophthalmology at the present day. The author is one who has enjoyed the unique rôle of being a physiologist, research worker and clinician. He has read widely on all aspects of his subject and the vast bibliography to be found in the text of the book is a testimony to his painstaking and thorough searches in this field. Much of the physiological work on the vascular circulation of the eye, intra-ocular pressure, metabolism, biochemistry and biological optics, is taken from his own researches. This textbook is the first of its kind to be written in the English language, hitherto contributions concerning the fundamental sciences on which ophthalmology stands have been written in separate books or briefly described in a textbook adapted to the needs of students. Mr Duke-Elder's textbook gives a full account of each of these fundamental scientific subjects and he has correlated them in an interesting and admirable manner. The book will appeal to the clinician, the research worker and the physiologist interested in the study of the special senses from a purely scientific point of view. The author has traced the transition of ophthalmology through the stages of ophthalmoscopic discoveries, the study of morbid histology of dead tissues, and the slit-lamp investigations of the living tissues of the eye, up to the advances made by biophysics and biochemistry at the present day. The present volume is concerned with the phylogeny, development, form and function of the visual apparatus, and is divided into eight sections subdivided into twenty-seven chapters. Section 1 gives an outline of the phylogeny of the visual apparatus and the genesis of vision, section 2 describes the anatomy and comparative anatomy of the visual apparatus, in section 3 an account is given of the autogenetic development of the visual apparatus and the embryology of the eye and its adnexa, section 4 is concerned with the physiology and biochemistry of the eye, and it is in this section that much of the author's original work on the vascular circulation, intra-ocular pressure and metabolism of the eye is described, section 5 is devoted to optics, physical, geometrical, physiological and biological, section 6 describes the physicochemistry of vision, section 7 is concerned with the physiology of vision and visual sensations, and section 8 is concerned with the psychology of vision. An index and a human interest is added to each section by the introduction of a great portrait of factors scientific and optical problems to which work has been of especial merit in the subject of that particular section. This textbook will be invaluable to all ophthalmologists, both as a guide and for the purpose of reference. The paper, printing, illustrations and illustrations are excellent.

*Textbook of Gynaecology* By SIDNEY FOLADIKER, M.D., B.S.,  
F.R.C.S. London: William Heinemann (Medical Books)  
Ltd., 1932. Pp 283. Illustrations 112. Price 15s.

OF the writing of gynaecological textbooks there is no end, and with so many large and comprehensive ones in the market it is difficult at first sight to see what useful purpose so small a book can fulfil. Perusal of the book, however, shows that the whole ground is so well covered—atomy, physiology, pathology, symptomatology, and even descriptions of operations—that this book will be very helpful to the student by giving a final polish to his work before his examination and to the busy practitioner who requires a hint to set his latent memory at work and who has no time to delve into the larger works. It is really extraordinary what an amount of information has been crammed into this small space, this has been brought about by eliminating all redundant words and much descriptive matter, and yet the book reads well and interestingly, and is not in the least reminiscent of a "cram book." To get the full value from the book the reader must have some previous knowledge of the subject. This means that when he first studies the subject he should get a comprehensive grasp of it by studying one of the larger textbooks or a good set of lecture notes, but as he approaches his examination this small textbook will be excellent. All essentials seem to be mentioned, and, though compact, the book is eminently readable. A special word of praise should be given to the illustrations, which are numerous, well chosen, and very clear.

*A Textbook of X-Ray Therapeutics* By ROBERT KNOX, M.D.,  
C.M., M.R.C.P. Completed and edited by WALTER M. LEVITT,  
M.B., M.R.C.P., D.M.R.E. London: A & C Black, Ltd.,  
1932. Pp viii and 250. Full-page plates 11, 60 illustrations  
in the text. Price 21s.

THE editing of a textbook on general medicine is a very different thing to that of editing a textbook on radio-therapeutics, in which changes in technique, in views and in its application follow one another in almost bewildering succession. When added to this there is the desire to retain the work and the memory of our old friend, Robert Knox, the task seemed all but impossible. The present edition, while for the most part necessarily re-written, retains throughout the principles laid down by the original author, and the introduction by Dr Alice V. Knox sufficiently indicates the nature of the alterations. The arrangement follows that adopted in the ordinary textbook in that it deals with various diseases, system by system, thus greatly enhancing the value of the work. In this arrangement, there are obviously many gaps, which further knowledge alone can supply. In chapter iv, in which X-ray measurement is very thoroughly discussed, the editor makes a strong plea for a more carefully defined unit skin dose and distinguishes it from the erythema dose. His arguments are good and warrant careful consideration. He points out that the unit skin dose is a fixed dose given at one exposure, while the erythema dose depends upon the time over which the treatment is spread, and is, therefore, variable. In particular chapters viii and xii, which deal with the principles of technique

and diseases of the blood respectively, are a great contribution to our present knowledge and should be read carefully by all modern workers. Especially does the author sound a clear and much needed warning in regard to the treatment of the leukæmias. While naturally emphasizing the value of hard rays and intensive treatment in carcinoma, there is no slavish claim for the superiority of these in other cases and this is all to the good. That the memory of Robert Knox will not suffer any diminution and that the reputation of the present author will be justly enhanced is the impression conveyed on careful reading of this book.

*Textbook of Medicine.* By various Authors, edited by J. J. CONYBEARE, M.C., M.D., F.R.C.P. Second edition. Edinburgh: E and S Livingstone, 1932. Pp. xiv and 1,001. Illustrations 26 and 14 X-ray plates. Price 21s.

ORIGINALLY published in 1929, this textbook maintains the tradition of successful books on medicine emanating from Guy's Hospital, as initiated by Hilton Fagge and Pye Smith's "Principles and Practice," dating from 1886, and Frederick Taylor's "Practice," which appeared in 1890, and is now under the editorship of Dr. E. P. Poulton, in its fourteenth edition. Dr. Conybeare has increased the number of contributors from ten to fourteen, and of the illustrations and X-ray plates, and made very considerable alterations; but the size of the volume remains much the same, and the price has been reduced from 22s. 6d. to a guinea. Dr. A. A. Osman has revised the article on renal disease, originally written by Professor Hugh Maclean, and the section on acidosis and alkalosis, which formerly was included under the heading of "Diseases of Metabolism" by the editor, has now been moved to that on renal disease. A good deal of rearrangement has taken place elsewhere, and many additions have been made. The editor has resigned some sections he previously wrote of the work, such as those on tropical diseases, to other hands, and has called in Dr. Knott to collaborate with him in the section on diseases of the blood, to which a useful physiological introduction has been added. The editor must be congratulated on his success in achieving the objects he set before him in this textbook.

*A Practice of Medicine.* By PROFESSOR ADOLF STRUMPFILL, edited by PROFESSOR E. SEYFARTH. Authorized translation by C. F. MARSHALL, M.D., F.R.C.S., and C. M. OTTLEY, B.M., F.R.C.S. London: Baillière, Tindall and Cox, 1931. 3 vols. Pp. xiv and 2,356. Coloured plates 17, 392 figures in the text, many of them coloured. Price 45.5s.

This classical work, which has been translated into English, French, Spanish, Russian, Italian, Greek and Turkish, first appeared in 1883, and so must be the senior current textbook of medicine and about to enter its jubilee. Professor Strumpfll died in 1925, and since then Professor Seyfarth has brought out two German editions, from the second of which this excellent translation has been made. It retains the essentially clinical character, on which the original author laid great stress, and now occupies three large and well got up volumes, the first contains the infectious beginning, like

Oster's "Medicine," with typhoid fever, and then tropical diseases and diseases of the respiratory system, the second volume deals with diseases of the organs of digestion, the urinary system, blood, metabolism and the endocrine glands, and the third with those of the nervous system. In the appendices the more important poisons are considered and a number of useful prescriptions are supplied.

*The British System of Social Insurance* By PERCY COMPTON. With an Introduction by the Rt Hon NEVILLE CHAMBERLAIN. London Philip Allan, 1932. Pp 278. Price 12s 6d.

THIS history and description of Health Insurance, Widows' and Orphans' Pensions, Old Age Pensions (contributory and non-contributory), Unemployment Insurance, Workmen's Compensation and Industrial Assurance, to quote the explanatory sub-title, backed by the authority of the Chancellor of the Exchequer and a former Minister of Health, will serve as a useful guide to those anxious to understand the complexities of the numerous enactments. It contains an enormous amount of information on various aspects, in the section on Health Insurance it is pointed out that in Great Britain and Northern Ireland there are more than seventeen million insured persons and nearly sixteen thousand medical men on the panel who attend some 140,000 patients daily. Workmen's Compensation is a much older form of insurance, dating from the Employers' Liability Act passed by a Liberal Government in 1880, it has undergone considerable changes in the half century as is shown by the list of diseases scheduled.

*A New Theory of Cancer and its Treatment* By C F MARSHALL, MSc, MD, FRCS. Bristol John Wright and Sons, 1932. Pp 53. Price 3s 6d.

MALIGNANT disease is, in this work, ascribed to (i) persistence of cells of the chorionic villi in some part of the body, and (ii) the presence of leucin in the blood, both these factors are essential. In the case of carcinoma a third factor is stated to be necessary, namely, the formation of a form of ferrous oxide which does not react to the ordinary chemical tests. The further changes leading to tumour growth are somewhat complicated. The early diagnosis of both carcinoma and sarcoma is made by the laevo rotatory action of the blood serum on polarized light, and treatment by the injection of a 1 per cent solution of a special form of ferric chloride in isotonic saline is advised before the formation of a tumour. All this is very new, but, as this booklet is presented as a forerunner to a later work describing further investigations, and, it is hoped, a method of preventive inoculation against cancer, it is only right to suspend judgment.

*Oh, Doctor!* By EDWARD SAMSON. London John Murray, 1932. Pp 125. Illustrated. Price 2s 6d.

THIS is a cheery series of letters from a young general practitioner, with an address at 191, Harley Street and a telephone number, "000 Harley," to his cosmopolitan crony, whose address is usually in Paris. It is a record, reminiscent of P G Wodehouse, of his adventures and devices on starting practice, it ends happily at the altar, and is a good (and cheap) antidote to depression.

# Notes and Preparations

## BOURNVILLE

Bournville is a garden factory in what is now a suburb but was formerly a completely rural district about four miles from the centre of Birmingham, devoted to the manufacture of Messrs Cadbury's cocoa and chocolates. The total number of employees is over 8,000, the hours worked average 44 per week, and the firm is controlled by nine managing directors, of whom seven are direct descendants of the founder, John Cadbury, who started business in Birmingham in 1824 as a tea and coffee dealer. On a recent visit to Bournville, at the invitation of the directors, we were greatly impressed by the educational schemes and the medical arrangements for the welfare of the workers. It is a condition of employment that all of the junior employees should attend regularly for medical inspection, and they receive free any medical treatment which is considered necessary. Even their teeth are not neglected and the staff includes three whole-time dental surgeons, five dental nurses and one mechanic, and all applicants for employment are examined by the dentist before being engaged, thereafter, it is compulsory for those under eighteen years of age to have any necessary treatment, which is given free of charge. The directors recognize the mental and moral effect of the environment of the worker, and have endeavoured to carry out any proposals which tend to create a healthy and pleasant atmosphere, and make "the works" as attractive as possible to the worker.

## CRYSTALLINE VITAMIN D

A pure crystalline vitamin D, manufactured in a British chemical works, has been at the service of research workers in this country since last December, but the British Drug Houses, Ltd (Graham Street, City Road, N 1) announce that this is now available for general clinical use, in the forms of Radiostol solution and Radiostol pellets. Radiostol solution is a tasteless solution in oil of the pure crystalline vitamin, its vitamin D activity is stated to be such that one fluid ounce of the solution is equivalent to fifty fluid ounces (2½ pints) of good cod-liver oil, the dose is from 9 to 15 minims daily. The Radiostol pellets contain the crystalline vitamin incorporated in cocoa butter, one pellet being equivalent to a full adult dose of cod-liver oil.

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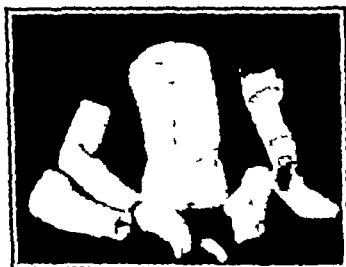
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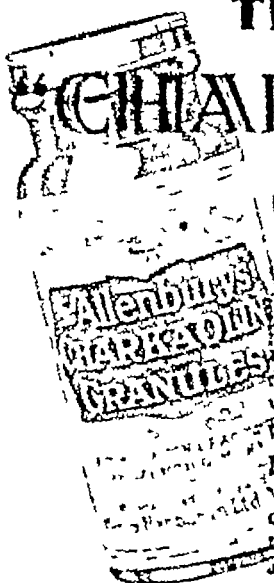
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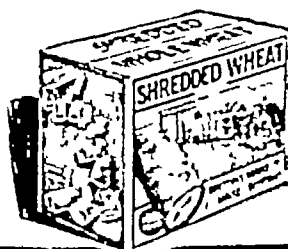
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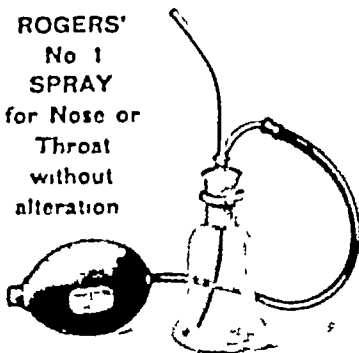
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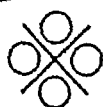
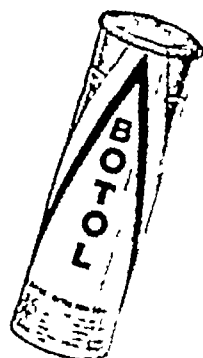
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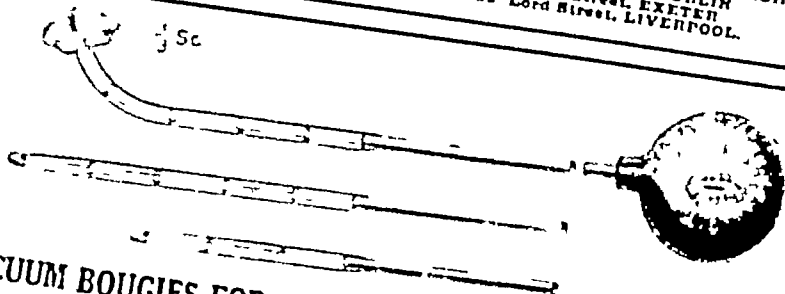
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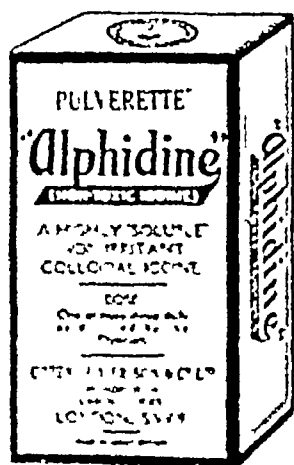
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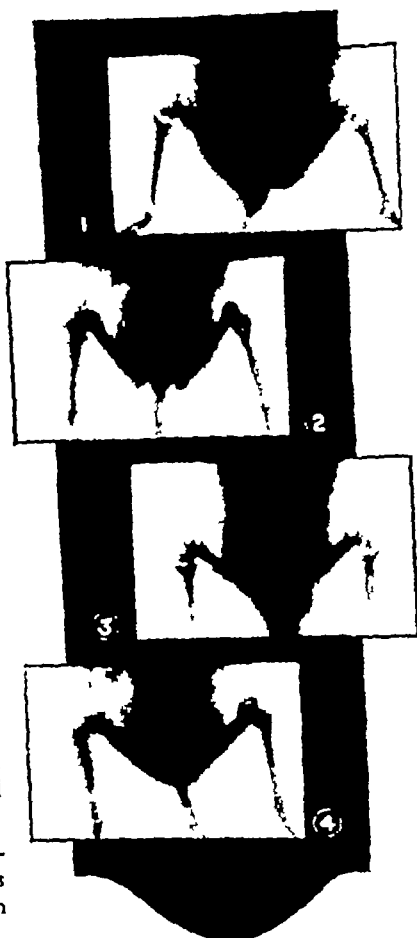
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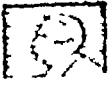
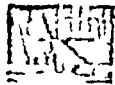



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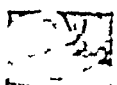
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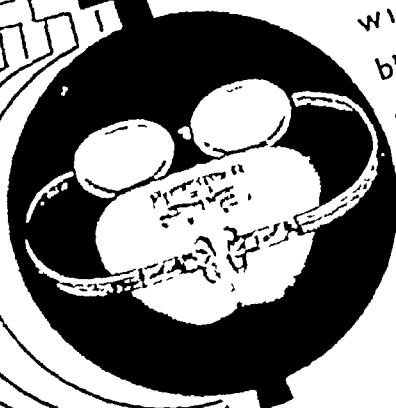
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The principle of the Curtis Abdominal Support Model No. 1 is that of anterior-posterior pressure and is the only support that gives direct abdominal uplift without cramping or binding the hips, assuring the patient freedom of movement at all times



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## ABDOMINAL SUPPORT

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"A Perfect Combination of Malt Extract  
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'Bynol' contains 30% by volume of the 'Allenburys'  
'Perfected' Cod-Liver Oil intimately commingled with the  
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digestible and palatable product. Cod-Liver Oil is the  
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Oil has been examined biologically and certified as fully  
active with regard to the vitamins A and D.

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# THEELIN

THE OVARIAN FOLLICULAR  
HORMONE IN CRYSTALLINE FORM

*In Ampoules and Vaginal Suppositories*

**Q** Theelin is the name given to the ovarian follicular hormone first isolated in crystalline form by Dr E. A. Doisy, Professor of Bio-chemistry at the University of St. Louis.

**Q** Theelin is indicated in the treatment of functional amenorrhœa, in the subjective disturbance of either artificial or natural menopause, in delayed puberty, and in all those conditions in which less purified ovarian extracts have been used. It has the great advantage that it is free from certain side reactions which may have been caused by the impurities present in varying amounts in the crude ovarian and follicular products.

**Q** Theelin is usually administered in solution, by intramuscular or subcutaneous injection, in doses of from 50 to 100 rat-units. The same physiological effect is produced when Theelin is applied intravaginally by means of suppositories, although somewhat larger doses may be required to produce the same results.

**Q** Each batch of Theelin (P, D & Co.) is tested and approved at the Biochemical Laboratory of St. Louis University before being released for sale.

Issued in solution for intramuscular injection in 1 c.c. and  $\frac{1}{2}$  c.c. ampoules, each c.c. representing 50 Doisy rat-units, in boxes of 6 ampoules. Also as vaginal suppositories in boxes of 6. Literature will be sent on request.

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## In Gastro-Intestinal Disorders

of a catarrhal ulcerative or tubercular nature Angier's Emulsion is particularly useful. The minutely divided globules of petroleum reach the intestines unchanged, and mingle freely with intestinal contents. Fermentation is inhibited, irritation and inflammation of the intestinal mucosa rapidly reduced, and elimination of toxic material greatly facilitated. An improved state of the digestive functions and modifications of the various symptoms traceable to auto-intoxication are notable results.

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improve and strengthen the organs of digestion and assimilation and enable patients to derive the fullest benefit from any prescribed diet. The creation of appetite and the return of normal digestion is quickly brought about by its regular use.

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respond actively to Angier's Emulsion. It is a tonic in effect and an aid to digestion. Being a perfect Emulsion it is presented in a form pleasing to the taste and acceptable to the most fastidious. Its good effects are accomplished in a safe and natural manner without entailing any extra work upon the weak or overburdened system.

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Free Samples to the Medical Profession.

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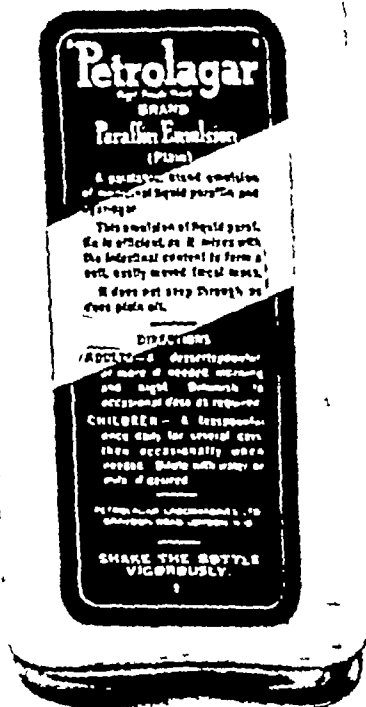
COMPLYING with repeated requests from a great number of our 'doctor friends we are pleased to announce a decided reduction in the price of 'Petrolagar.'

Doctors may now prescribe it more freely in the treatment of intestinal disorders with the assurance that their patients can well afford to continue its use until definite results are obtained.

The high standard of quality which has made 'Petrolagar' so successful will always be carefully maintained

'Petrolagar' prices reduced on and after  
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8 oz. now 2/6d.      16 oz. now 4/6d.



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# VICHY-CELESTINS

The world renowned NATURAL Mineral Water.

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#### PRIMARY DYSPEPSIAS

Hyperpepsia—Intermittent hyperchlorhydria  
Hypoepsia and aepsia—Dyspepsia arising  
from disturbance of neuro-motility  
Intermittent pyloric stenosis, not of organic  
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Arthritic dyspepsia  
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Congestion due to excessive or improper  
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## "OPOJEX" OVARIAN RESIDUE (B.O.C.)

(Ovary *sine* Corpus Luteum) (Free of *in Firore*)

Supplied in boxes of 6 ampoules of 1 cc. for intramuscular injection

# A Valuable AID in MIDWIFERY

as a routine in the early stages of labour  
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Ovarian Residue ("Opojex") tends to shorten labour considerably  
and to render it almost painless throughout the first and the  
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*Extract from a doctor's letter which appeared in the  
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"I consider the safest and most effective analgesic I have come across in forty years is ("Opojex") ovarian residue without corpus luteum. As soon as labour has started an injection of this extract is given in the buttock, and in less than twenty minutes the pains are altered into a strong bearing down, without the cramping pain usual in labour, which goes on by itself, the patient being encouraged not to bear down for a considerable time—say, an hour. The action is contraction of the fundus, the lower zone of the uterus and cervix relax, and the perineum is found to be very lax, and seldom tears, this I think, is ideal. The dose can be repeated every two or three hours if necessary but usually the case is over long before that. I have found the extract a revolution in obstetrics, and it should be used as a routine in every case; it is also useful for the induction of labour."

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" . . . Some time ago I resolved to try for the first time a vaccine in whooping cough and the results were so excellent that I thought you would be interested to hear from me

(a) Three children aged 3 years, 2 years, and 8 months, were treated when the disease was about 10 days established, all were completely cured after the third injection—the mother described the effect to me as simply miraculous

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*Address all orders and inquiries to the General Manager, The Vaccine Department, The Vaccine Department, Ltd., 1, Long's Quay, Lancaster.*

A new organic Gold Salt  
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For the Treatment of  
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# COMBATS RHEUMATISM BY BANISHING AUTO-INTOXICATION

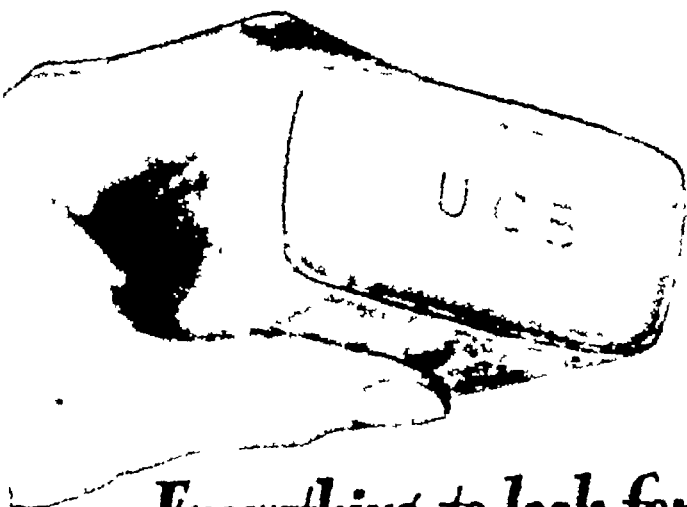


The prevalence of such maladies as rheumatism, lumbago and neuritis, is now generally recognised as being in many cases directly attributable to auto-intoxication arising from constipation. Sal Hepatica is a proved, medicinal, effervescent saline which stimulates the bowels to peristaltic action ensuring the elimination of all toxic waste products. Its sodium phosphate content increases the secretion of bile, thus restoring the daily habit of defecation by natural means. Unlike many other laxatives the above increasing dosage is unnecessary. Sal Hepatica does not cause depression, griping or weakness.

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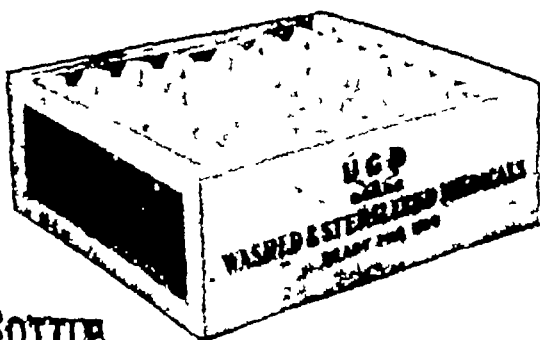
the proved medicinal, saline laxative & cholagogue.



## Everything to look for on a Bottle..

IMITATION may be the sincerest form of flattery, but the extent to which the U G B Medical Bottle is imitated in inferior quality is far from gratifying. Designed some ten years ago as an ideal dispensing bottle, it is now the standard for this purpose. The consistently high quality, accurate capacity, and attractive appearance, place the U G B Medical Bottle in a class by itself.

"Washed and Sterilized" Bottles in non-returnable cartons supplied either for corks or white enamelled screw caps.



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*you can be sure*  
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## "ALL-BRITISH" PRODUCT



*Determining the amount of fat which is present. The fat content of milk used in Horlick's Malted Milk is well above the Government standard.*



### STANDARDIZATION OF ONE OF THE INGREDIENTS OF THIS FAMOUS BRITISH PRODUCT

*At present, a very small quantity of milk is produced in this country which is of the same standard as that used in Horlick's Malted Milk. The Government standard for the fat content of milk is 3.5 per cent. The milk used in Horlick's Malted Milk is of a much higher standard.*



*A lactometer floating in a sample of milk. It signifies the specific gravity of the milk, and can be calculated the amount of milk present.*



*The specific gravity of the milk is determined by the lactometer. The milk used in Horlick's Malted Milk is of a much higher standard than the Government standard.*



**H**ORLICK'S Malted Milk was originated half a century ago by an Englishman, Sir James Horlick, Bart, and year by year it has won ever-increasing popularity until today it is recommended by the medical profession all over the world.

Just now, when patriotic men and women in this country are uniting their efforts to support home industries, it is particularly satisfactory for doctors and nurses to know that Horlick's Malted Milk is an all-British product.

**ENGLISH DAIRY FARMS SUPPLY THE FRESH FULL-CREAM MILK THAT GOES INTO HORLICK'S.**

Cows fed on the richest pasture lands of England produce the fresh full-cream milk from which Horlick's is made. Brought from the eastern counties — malted at Horlick's own Maltings in Norfolk, and home-milled British wheat only, are used in its manufacture.

### BRITISH EMPLOYEES

Horlick's Malted Milk Company Ltd., which is English in character and capital, has a factory and warehouse in London, and a large number of employees in the various departments of the business.

### EVEN THE BOTTLES ARE BRITISH!

Only Horlick's Malted Milk is bottled in England. The bottles used in Horlick's Malted Milk are of the best quality, and are made in England.

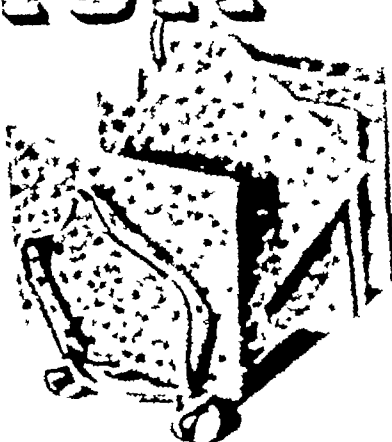
HORLICK'S MALTED MILK CO. LTD., SLOUGH, BUCKS.

This crispbread is

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and its name is  
VITA-WEAT

Naturally you want now, more than ever, to spend your money wherever you can on British grown and British-made commodities. Vita-Weat is made by Peek Frean, a British firm, in Britain, by British labour, of only British wheat. British milled and British-baked. Every penny you spend on it goes to your own people, stays with your own people. And every bit of the golden grain, with all its precious vitamins, its wealth of nourishment, is preserved in Vita-Weat in a form that must nourish you. Every day more and more people are making Vita-Weat their daily



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THE BRITISH WHOLEWHEAT CRISPBREAD

*A Free Sample will be sent on receipt of a postcard addressed to Peek Frean & Co., Ltd., Drummond Road, London, S.E. 16*

Made by PEEK FREAN, Makers of Famous Biscuits

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1. *The relaxation of tissues, particularly of the muscle fibres;*
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Antiphlogistine Dressing, therefore, may be prescribed with every confidence in all inflammations and congestions and wherever it is desired to create an intensive hyperæmia in any particular area.

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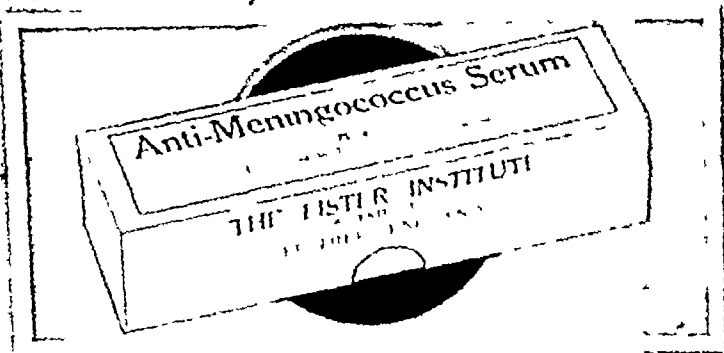
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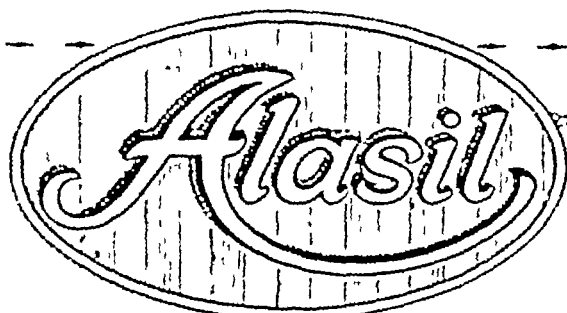
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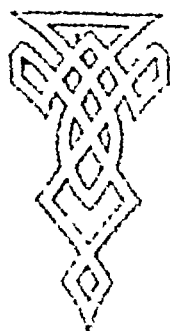
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Antipyretic  
Sedative



Acetyl-salicylic acid possesses a notable disadvantage. Physicians have proved that it cannot be tolerated by patients suffering with a delicate stomach. Consequently, the value of this medicament in the wide field in which it is indicated is very seriously reduced.

"Alasil" completely overcomes this objection. By combining calcium acetyl-salicylate with "Alocol," unfavourable secondary action upon the stomach is prevented. This beneficial influence is undoubtedly due to the presence of "Alocol" (Colloidal Hydroxide of Aluminium), which preparation has brilliantly stood the test of practice in the treatment of hyperacidity and other ill conditions of the gastric tract.

"Alasil" is therefore a triumph over acetyl-salicylic acid. It enables higher doses to be administered and maintains the patient's system under its influence for a greater length of time.

Analgesic, Antipyretic and Sedative.  
"Alasil" is indicated in all cases where acetyl-salicylic acid has been contraindicated.

Group of drugs  
used with full  
scientific literature  
in the treatment  
of all diseases  
A. W. DILLON  
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# Successful Treatment of Hyperchlorhydria and Associated Conditions

It is well known that the treatment of hyperchlorhydria and associated conditions is a difficult task. The treatment of hyperchlorhydria and associated conditions is a difficult task. The treatment of hyperchlorhydria and associated conditions is a difficult task.

The object of this treatment is to reduce the secretion of gastric acid and to relieve the associated symptoms. The object of this treatment is to reduce the secretion of gastric acid and to relieve the associated symptoms. The object of this treatment is to reduce the secretion of gastric acid and to relieve the associated symptoms.

Furthermore, the treatment is to relieve the associated symptoms of hyperchlorhydria, such as indigestion, heartburn, and acidity. Furthermore, the treatment is to relieve the associated symptoms of hyperchlorhydria, such as indigestion, heartburn, and acidity. Furthermore, the treatment is to relieve the associated symptoms of hyperchlorhydria, such as indigestion, heartburn, and acidity.

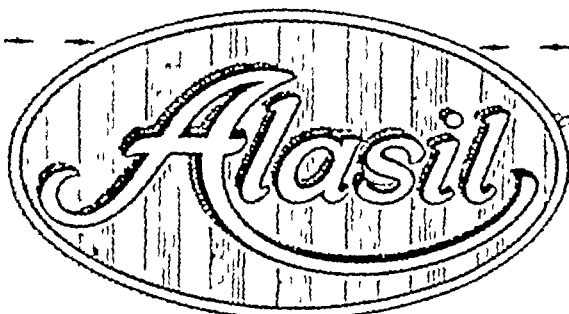
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SOLE AGENTS

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# Analgesic Antipyretic Sedative



Acetyl-salicylic acid possesses a notable disadvantage. Physicians have proved that it cannot be tolerated by patients suffering with a delicate stomach. Consequently, the value of this medicament in the wide field in which it is indicated is very seriously reduced.

"Alasil" completely overcomes this objection. By combining calcium acetyl-salicylate with "Alocol," unfavourable secondary action upon the stomach is prevented. This beneficial influence is undoubtedly due to the presence of "Alocol" (Colloidal Hydroxide of Aluminium), which preparation has brilliantly stood the test of practice in the treatment of hyperacidity and other ill conditions of the gastric tract.

"Alasil" is therefore a triumph over acetyl-salicylic acid. It enables higher doses to be administered and maintains the patient's system under its influence for a greater length of time. Analgesic - Antipyretic and Sedative.

"Alasil" is indicated in all cases where acetyl-salicylic acid has been used heretofore.

Every physician  
should keep a full  
supply of Alasil  
in his medicine chest  
for emergency use.

## Successful Treatment of Hyperchlorhydria and Associated Conditions

"Alocol" (Colloidal Hydroxide of Aluminium) has proved remarkably successful in the treatment of hyperchlorhydria, gastric ulcer, fermentative dyspepsias with gastro-intestinal flatulence, acid eructation and other symptoms common to gastric disease.

The advantages of "Alocol" are that it actually removes from the system the causative acid radicle (Cl) instead of merely neutralising it, and so permitting reabsorption, accumulation and consequent recurrence of the symptoms of the disease.

Furthermore, "Alocol" neither hinders proteolysis nor causes destruction of any food element or factor. "Alocol" has a distinct healing and sedative effect, it promptly allays irritation by absorbing acid and other irritants.

*Complete chemical history of 'Alocol' with convincing clinical reports and supply for trial sent free to physicians on request*

A WANDER, Ltd, Manufacturing Chemists,  
184 Queen's Gate, London, S W 7

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N. 31

# ALOCOL

Colloidal Hydroxide of Aluminium



# In Infancy

WHETHER the child be breast-fed or bottle-fed, constipation is often a troublesome feature. Castor oil and other purgatives, or aperients, while securing a prompt action of the bowels, possess certain definite disadvantages with which the practitioner is fully acquainted.

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'Cristolax' is a valuable table preparation for the nursing mother both during and after delivery, in general, and also for the delicate mother, without purging, straining, or harmful effect upon the child.

**'CRISTOLAX'**  
BRAND  
MALT EXTRACT AND CASTOR OIL  
*The only reliable Natural Purgative*

WANDER LTD, 151 QUEEN'S GATE, LONDON, S.W. 7

1/6 per bottle  
1/3 per 6 bottles  
1/2 per 12 bottles  
3/6 per 24 bottles



MADE IN AUSTRIA BY  
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1/6 per bottle  
1/3 per 6 bottles  
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3/6 per 24 bottles

## For the Aged

"Ovaltine" is delicious sustenance for old people. It sustains life ideally by giving tone to the tissues and promoting healthy functional activity.

"Ovaltine" provides complete nourishment in easily assimilable form. Its use greatly increases the nourishing value of other foods. The digestibility of milk is increased two-fold by adding "Ovaltine" to it, while the starch in the cereals is converted into easily assimilated malt sugar by the enzyme diastase which "Ovaltine" contains in abundance.

"Ovaltine" is purin free. Its use, therefore, neither aggravates, nor favours the accumulation of uric acid in the system, nor leads to kidney disorder or gout. The tendency to constipation, so common in old age, is avoided by the use of "Ovaltine."

"Ovaltine" replaces to great advantage the usual meal-time beverages, tea and coffee, which are valueless as nourishment and often contra-indicated in senility.

**OVALTINE**  
TONIC FOOD BEVERAGE

*The Sun's Disc with brightly coloured wings*



*The Emblem of a Victorious King*

*A liberal supply for clinical trial sent free on request*

A WANDER, LTD, 184 Queen's Gate, S W 7  
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For the Administration of CARBON-DIOXIDE, OXYGEN, or a MIXTURE OF BOTH- as a respiratory stimulant

The APPLIEDUS 2000 is a portable, battery-powered analyzer with a built-in microprocessor and a built-in set of  $\text{CO}_2$ ,  $\text{O}_2$ , and  $\text{O}_2/\text{CO}_2$  partial gas values. It is used to measure the partial pressure of gas in a blood sample.

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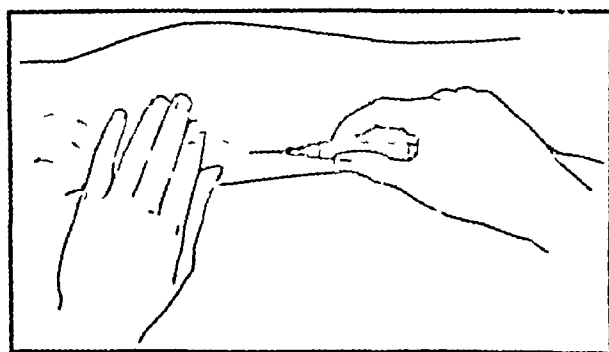
*A complete Outfit sent on approval to any Practitioner  
 who recommends it to his Patients and use*

**SPARKLETS LTD., London, N.18**

# SCLEROSING SOLUTIONS

## for Varicose Veins

'Hypoloid' Products for sclerosing varicose veins present convenient quantities of solution in hermetically-sealed containers ready for immediate use



### 'HYPOLOID'

#### QUININE AND URETHANE

Quinine Bihydrochloride, 0.26 gm., and Urethane,  
0.13 gm., in 2 c.c.

2/- per box of 5 phials

3/- per bottle of 25 c.c.

### 'HYPOLOID'

#### SODIUM SALICYLATE

20, 30 and 40 per cent solutions

5 c.c. phials, 2/- per box of 5

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#### SODIUM MORRHUATE

5 per cent and 10 per cent solutions

2 c.c. phials, 3/- per box of 5

1/- per bottle of 25 c.c.

Prices quoted are those in London to the Medical Profession



BURROUGHS WELLCOME & CO., LONDON



## Acute Obstructive Cholecystitis

By D P D WILKIE, OBE, MCh, FRCS

*Professor of Surgery in the University of Edinburgh*

**A**N attack of biliary colic may be caused by the passage of a small gall-stone down the cystic duct or to its arrest at the sphincter of Oddi at the lower end of the common duct, more frequently, however, it is due to the impaction of a stone, too large to negotiate the cystic duct, in the neck of the gall-bladder or in the pouch-shaped infundibulum known as Hartmann's pouch (Fig. 1). The subsidence of the attack of colic means that the calculus has become disimpacted and has rolled back into the lumen of the gall-bladder.

We thus find that in cases in which a single cholesterol stone is present in a gall-bladder, the wall of which is not the seat of infection, recurring attacks of afebrile colic appear in the midst of good health, and passing, leave the patient without signs or symptoms. Where, however, the gall-bladder was previously infected or where the stone remains impacted and infection is superadded, we get the typical clinical picture of acute obstructive cholecystitis. The combination of the two factors of infection and complete obstruction of the outlet results in pathological

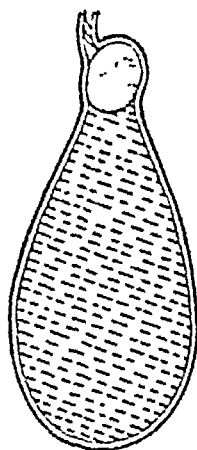


FIG 1—Single cholesterol stone impacted at neck of gall bladder

the right half of the diaphragm, as proved by X-ray examination

The picture may, therefore, closely resemble a primary right-sided lung affection. The chill at the onset, the thoracic pain, the catch in the breathing, combined with the fact that, owing to the immobile diaphragm and deficient expansion of the right base, crepitations are frequently to be heard on auscultation; all these features may divert attention from the abdomen to the chest (Fig. 2). Many of my patients gave a history of previous attacks diagnosed as "congestion of the right lung." The pulmonary signs should always be looked for and assessed at their true value.

Another misleading feature may be the low-lying position of the tenderness and resistance when there is

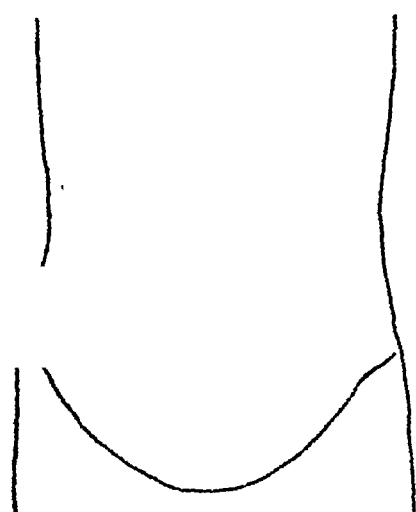


Fig. 2. Diagram illustrating the position of the liver in the right lumbar region.

a long right lobe of the liver. In such cases the maximum tenderness and resistance are felt in the right lumbar region of the abdomen, well to the right of the umbilicus, and the question of a retrocecal appendix abscess may arise. On careful examination, however, it is noted that the hand cannot define an upper margin of the resistance and that on percussion

the dull note over the area is continuous with that of the liver (Fig. 3).

Regarding the intestinal symptoms, it is not uncommon to find a slight attack of diarrhoea as a prelude to an attack of enterocolitis. When, however, the gall-bladder is seriously diseased and inflamed obstinate constipation is the rule.

In some cases, and notably the

in elderly subjects, the chief complaint may be the obstipation and sense of abdominal distension, and, on examination of the abdomen, right-sided fullness in the iliac and lumbar regions may be noted. At first sight this may suggest some obstruction, possibly by growth, in the region of the hepatic flexure. It is due to adhesion of the hepatic flexure to the inflamed gall-bladder. The colon at this point becomes itself oedematous and inflamed, its peristalsis is, in part at least, arrested, and it acts as a potential obstruction, with consequent gaseous distension of the cæcum and ascending colon (Fig. 4).

It is usual to observe a slight but definite icteric tinge in the skin and conjunctiva within twenty-four hours of the onset of the attack. At this time also a trace of bile in the urine can always be detected. This mild icterus is due in part to inflammatory oedema around and in the wall of the common bile duct, but also in part to an accompanying hepatitis. In a few cases it is more pronounced, and in these is probably

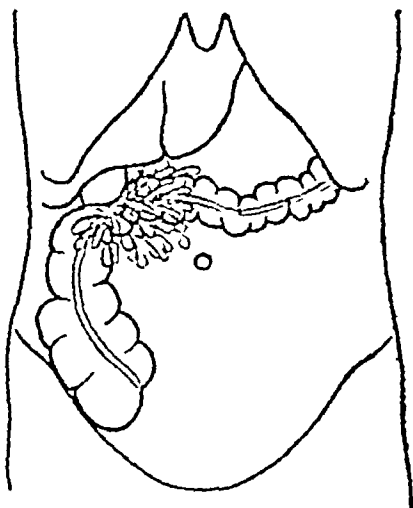


FIG. 4.—Distension of proximal colon from oedema of adherent hepatic flexure.

due to direct pressure of a distended Hartmann's pouch on the common duct. In my experience it is extremely rare to find a stone in the common duct in these cases.

Examination of the blood will almost invariably show a leucocytosis. For diagnosis this is not of much significance, but for prognosis and as a guide to treatment repeated leucocyte counts may be of real value. The demonstration of a rising leucocytosis when, at



cholecystectomy is not advisable in elderly patients in the acutely toxæmic phase.

#### OPERATION IN THE SUBACUTE PHASE OF OBSTRUCTIVE CHOLICYSTITIS

In the majority of cases, after two days of acute discomfort with fever, the symptoms abate, but a rounded tender swelling remains. Operation may, with advantage, be postponed for three or four days until the accompanying hepatitis has subsided and

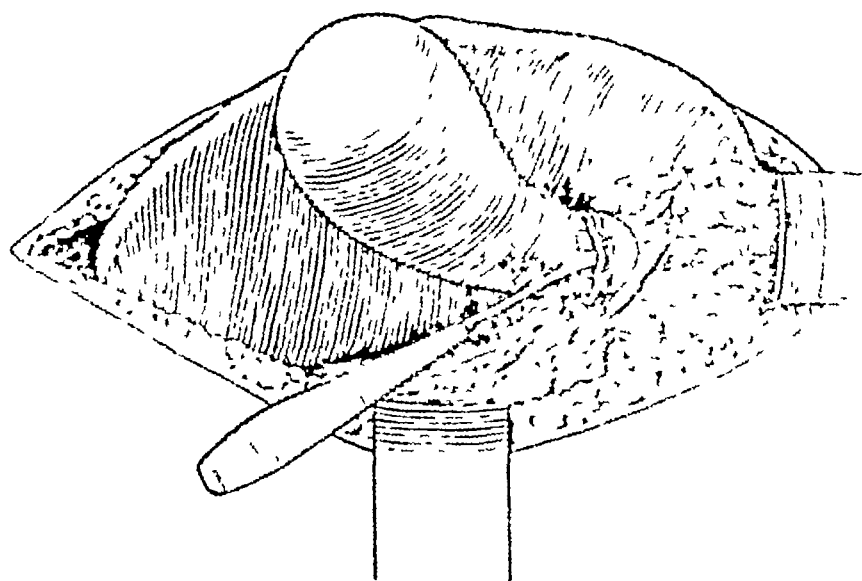


FIG. 2.—4 in. operation' incision, the distance above the umbilicus.

diaphragmatic movement has returned. Under general anesthesia, preferably gas and oxygen, supplemented with a little ether if required, and with the patient's lower ribs elevated on an air-cushion, the abdomen is opened with an oblique (Kocher) incision. The recent adhesions of omentum, colon and duodenum to the gall bladder are separated and access obtained to the gall bladder neck. In some cases in which the gall bladder is very large and tenacily distended access is facilitated by tapping it with a large trocar and

cannula; more often this is not necessary.

The cystic duct is usually obscured by inflammatory œdema and its junction with the common duct difficult to display. It is wiser not to endeavour to dissect through the œdematous tissue surrounding the duct as troublesome bleeding may be caused or the common duct inadvertently injured. An encircling incision should be made through the thickened outer coats of the gall-bladder wall over the prominent infundibulum, and, working in the submucous layer, the cystic duct is reached and ligated (Fig 5).

An incision is then made through the outer coats of the organ, parallel to and one-eighth of an inch from its attachment to the liver, on either side up to the fundus. By gentle stripping, from cystic duct to fundus, the gall-bladder is freed from its liver bed, the cystic vessels being exposed and ligated. No attempt is made to close over the gall-bladder bed and a large cigarette drain is inserted down to the stump of the cystic duct and brought out at the outer angle of the wound, which is closed in layers. As a safeguard against post-operative strain from coughing two through and through silk-worm gut sutures may with advantage be inserted.

Adequate exposure, gentle handling, and the avoidance of hæmorrhage are the three essentials for this operation, which has, as a rule, a remarkably smooth after-course. If for one reason or another adequate exposure cannot be obtained it is much wiser to do the simpler operation of cholecystostomy, always provided that the "keystone" at the neck is removed. In the post-operative period the Fowler position to facilitate basal expansion, and the administration of fluid and glucose to aid excretion and liver function are the essentials.

# Chronic Pain in the Lower Abdomen

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CHRONIC aching pain in the lower abdomen, worse on exertion or long standing, better when the patient rests, is one of the commonest complaints brought to the gynaecologist. The majority of these women are in the active period of sexual life, mothers of young families, overweighted with the cares and never-ending duties associated with a house and children. Rest, mental and physical, the treatment which is most likely to be beneficial, is the one which cannot be carried out, and many continue from year to year, never free from dragging aching pain while carrying out their household duties, and it is not to be wondered at that they become prematurely aged, while their tempers become frayed and irritable, and domestic happiness is impaired. Acute pain for a short time can be endured, chronic aching pain gradually wears down the most cheerful disposition and there is little doubt that more homes are destroyed by chronic aching pain than by alcohol. Chronic pain in the lower abdomen is frequently caused by slight lesions in a patient with impaired general health. Lesions which in a woman of full healthy vigour would cause no inconvenience, in many it is due to a general surgical condition and in others to a lesion more properly referred to a gynaecologist.

Although I propose to discuss chiefly chronic pain in the lower abdomen, it is impossible to separate it completely from chronic pain in the back, almost all patients suffering from pain in one of the regions, due to a gynaecological condition, have pain in both

regions although it is more marked in one than in the other. The conditions which produce this pain are legion and a large number are curable by operation hence the necessity for thorough investigation of each case before advising any operation. If this is not done very carefully the patient may be subjected to an illimitable series of operations, as so many patients of this class will readily submit to operation after operation. The patient with chronic aching pain, depressed, irritable, careworn, tired of life as at present constituted, remembering what it was like to be pain-free, readily accepts any suggestion which promises to cure her, and if one operation fails demands another. We all have these patients and we all know how difficult it is to persuade them to try medical treatment, especially if they have had one operation and this has failed. If two operations have been performed and failed it is still more difficult to persuade her not to have a further one and she wanders round from surgeon to surgeon, seeking relief by surgical interference, until finally, losing faith in our profession, she joins the large army who bring wealth to the quacks.

The first point to bear in mind is the fact that mental and bodily weariness will produce marked symptoms from a very minor lesion and a large proportion of these patients will derive much more benefit from a month's quiet holiday away from home and family than from any operation, and so, if the patient looks tired and weary and no definite lesion, or only a slight one, can be found, the effect of general medical treatment combined with mental and physical rest should first be tried. The difficulty is to get this treatment carried out and not infrequently the benefit derived from an operation is due more to the mental and bodily relaxation while the patient is in the nursing home or hospital than to the operation itself.

This is an illustration of changing customs. in the past generation the hard-working mother obtained

her annual holiday by a ten days' puerperium spent in bed; now many seem to obtain it by a post-operative convalescence spent in the same restful surroundings.

*General medical and surgical conditions.*—Intestinal derangements are common causes of chronic or recurring pain in the lower abdomen, and although these more properly come within the province of the general physician and surgeon, the gynaecologists must always bear in mind the possibility of chronic appendicitis, visceroptosis, mobile kidney, intestinal adhesions and flatulence being the cause of the trouble. Chronic appendicitis and chronic salpingitis not infrequently occur together and still more frequently a differential diagnosis is impossible until the abdomen is opened. Therefore the gynaecologist when opening the abdomen for chronic pain must examine the appendix and conversely the general surgeon must examine the appendages. From a large experience of patients with pain due to chronic pelvic adhesions whose appendices have already been removed, I do not believe it is ever justifiable to remove a chronic appendix from a woman through the pfannenstiel incision. This should always be done through a central incision, which allows a thorough examination to be made of the pelvic and abdominal organs.

If circumstances allow, it is better for the surgeon and gynaecologist to work together, but if this is impossible this type of case is best left to the gynaecologist, as it requires much experience to decide how to deal with the offending tube and ovary, whereas with the appendix the decision can only be between retention and removal. In making a diagnosis between the two conditions, recurrent attacks of sharp pain, accompanied by retching or a feeling of nausea and with tenderness over McBurney's point are in favour of an appendix, while a pelvic adhesion due to tubal infection more frequently causes a chronic aching pain, worse on exertion, a tender mass to the side of the uterus, and

to tenderness and pain referred to a point about one inch above the centre of Poupart's ligament.

Equally common, but often more difficult to diagnose or to assess the amount of pain likely to be occasioned by the condition, is visceroptosis; sometimes the stomach and most of the viscera are prolapsed, sometimes only the colon, but this condition does give rise to much aching dragging pain and must always be carefully excluded in these cases. In doubtful cases an X-ray examination is useful.

Another troublesome intestinal condition, sometimes alone, sometimes occurring with visceroptosis, is flatulence and constipation, and this should be sought for and treated.

A prolapsed kidney is a common cause of chronic pain, usually this pain occurs in the upper abdomen, but infrequently it is situated in the iliac region. Renal calculi produce pain in the iliac regions, but this is usually acute rather than chronic.

Cholecystitis and gall-stones again may be overlooked, though very rarely if a careful examination is made, as the pain is referred to the upper abdomen. These must, however, be borne in mind and the gall-bladder carefully examined in the routine examination.

Last year a patient was referred to me with pain in the right iliac fossa. I could not find any pelvic cause for the pain and asked one of my surgical colleagues to investigate the urinary system. He found the right ureteral orifice dilated, but both kidneys were proved to be functioning well and nothing abnormal was found in the urine from either side. A few months later this patient's doctor persuaded me to readmit her to hospital as the pain still persisted. I now examined her under general anaesthesia, but could discover no cause, so again I referred her to my surgical colleague. On this occasion he found that the right kidney was a little enlarged, and further investigation showed that it was not functioning so well as before, and moreover tubercle bacilli were now found in the urine from that organ. This kidney was removed and found to be tuberculous. The interesting point is that the pain was all along referred to the right iliac region.

Having eliminated general medical and surgical conditions there are a large number of gynaecological conditions to be kept in mind when investigating a

patient with this symptom, some very common, others much rarer. To check any preconceived opinions I might hold about their relative frequency, I have analysed the notes of a consecutive series of 350 patients who consulted me for this symptom and in whom I could find a definite gynaecological lesion to account for it, and in the following discussion they are placed in the order of their frequency.

*Lax pelvic floor.*—Of all the gynaecological conditions causing chronic pain, this is the commonest. The uterus is suspended in the pelvis chiefly by the muscular tissue of the pelvic floor. In the majority of women this is strong, firm tissue, capable of performing its function no matter how great the strain to which it is subjected. In a small minority it is badly developed, and if these girls undertake heavy work, necessitating strong contraction of the abdominal muscles, the increased intra-abdominal pressure gradually stretches this weakened floor and allows the uterus to descend. This explains why prolapsus uteri in virgins is more common in the industrial north than in the south. The condition which so frequently tears and damages this floor is parturition, and so it is not surprising to find this tissue weakened after this strain.

If the pelvic floor is well developed, prolapse of the uterus can only occur when this floor is over-stretched and damaged. This damage is usually produced by parturition, and although it is more likely to follow instrumental delivery, it not infrequently occurs when the labour has terminated naturally without any tearing of the superficial structures. When this floor is damaged to any great extent the uterus will descend into the pelvis and finally appear out of the vulva. In the early stages the patient herself is aware of the condition and the discomfort it causes; but laxity of the pelvic floor not sufficient to allow the uterus to descend far into the pelvis very frequently gives rise to dull aching pain in the lower abdomen and back pain

which is increased with exertion or long-continued standing. This is by far the commonest cause of chronic aching pain in parous women and must always be looked for when one of these patients consult us.

Fortunately it is a condition which can be cured without any mutilating operation: all that is required is a double colporrhaphy, but great care must be taken to suture the lax and torn muscles of the pelvic floor and the patient must avoid any strain upon these muscles for three months. This operation fulfils the ideals of conservative surgery; it replaces parts to their original condition, is fairly free from risk, does not entail an abdominal incision, and seldom fails. If the laxity of the pelvic floor is so slight that there is some doubt whether it is the cause of the pain, it is best to insert a rubber watch-spring pessary and allow the patient to wear it for some time. If the pain is removed or lessened when wearing it, it is proof that this laxity is the cause of the pain and a colporrhaphy can be performed; if there is no improvement some other cause must be sought.

*Matted appendages.*—This is the next common cause of chronic pain. The great majority of patients with this condition date their trouble to a confinement or miscarriage, and many know that the puerperium was not straightforward. In another group, not nearly so large as the last, the infection is gonorrhœal and in these there is a history of copious discharge commencing suddenly and accompanied or followed by pain in the lower abdomen and dysuria, although in a number of cases the infection spreads to the tubes without producing any very severe pain or general disturbance. In a still smaller group the condition is found in nulliparæ in whom there is no possibility of gonorrhœal infection, not infrequently in girls who are definitely virgins; in the majority of these the original trouble was a tuberculous peritonitis and in some of these a history can be obtained of an abdominal illness



uterus, whereas old cascating glands are in childhood, while in of any rise to aching pain in the found. This condition gives rise to aching pain in the lower abdomen and back, in some cases limited to one side, in others over the whole of the lower abdomen, and this pain is worse on exertion and before menstruation. In some there is a definite tenderness in one of the iliac fossae, especially with bimanual examination and a tender swelling can be detected to one or both sides of the uterus or in the pouch of Douglas.

Not infrequently these old damaged tubes and ovaries become reinfected by *Bacillus coli* and we see the patient with severe pain and tenderness in the lower abdomen, a raised temperature and sometimes a rapid pulse. If the trouble is limited to the right side it is often difficult to distinguish between this condition and an acute appendix.

*Cystic ovaries and ovarian cysts*—There is a difference of opinion about the symptoms produced by cystic ovaries but I think they frequently give rise to chronic pain, and the fact that they occur so frequently in this series would seem to support this view. What I was surprised to find was the comparatively large number of simple multilocular ovarian cysts in this list, as they are not supposed to produce pain. As none of these cysts were of great size I presume that an ovarian cyst produces pain in the early stages while it is stretching and compressing some remaining ovarian tissue, and that the patients were brought to me while the remembrance of this pain was fresh in their minds.

*Uterine fibroids*—Pain is not commonly produced by uterine fibroids though it does sometimes occur in a fibroid which is rapidly enlarging or undergoing certain types of degeneration. More frequently, when a uterine fibroid is found in a patient suffering from chronic pain, there is some slight laxity of the pelvic floor and the weight of the tumour is sufficient to stretch the ligaments and so produce the pain. Occasionally the tumour may press on the plexus, or drop into it

after the menopause and by its pressure alone produces some aching pain. The diagnosis is easy—the presence of a solid tumour attached to the cervix, and the treatment necessitates the removal of the tumour.

*Carcinoma of the cervix*—The fact that this condition appears next upon my list is a sad commentary upon the late stage at which these patients appear for consultation. Pain in carcinoma of the cervix is a late symptom and I do not think that any patient with this symptom can be cured. Here again the diagnosis is easy, irregular hæmorrhage with some friability of the cervix, and the treatment is either a Wertheim's hysterectomy or radium.

*Chronic cervicitis*—The cervix is relatively insensitive and many authors are doubtful whether any condition of the cervix itself can produce pain. It may be that these cases of chronic cervicitis which produce pain do so by distension of the deeper portion of the glands and that these compress structures adjacent to the cervix, but there is no doubt that cure of this condition, whether by local application of drugs, cauterization or amputation, does remove this pain. The pain produced by chronic cervicitis is usually referred to the sacral region, but some of these cases complain also of pain in the lower abdomen. The diagnosis of chronic cervicitis depends upon the history of the chronic pain being accompanied by a vaginal discharge, usually containing thick glary material, dating from a confinement or from an acute onset of the discharge. The cervix is thickened, often lacerated, and contains ovula nabothi.

*Malignant disease of the ovary*—This is a much less common disease than those mentioned above and so the fact that it comes next in the list shows that chronic or recurring pain must be a frequent symptom. This symptom does not depend upon extension of the growth to other structures, as it was present in patients in whom the malignant ovaries were comparatively small

and quite free from adhesions. In future, I shall pay more attention to this symptom in a patient with doubtful pelvic findings. The diagnosis of this condition depends upon the presence of a solid mass in the pelvis or lower abdomen with free ascites, and in the earlier stages often presents great difficulty.

*Endometrioma*—In this condition, endometrial cells, cast off during menstruation, pass along the Fallopian tubes to the peritoneal cavity and grow upon any structure upon which they alight. Most commonly this is the ovary and by the growth of the endometrial tissue this is intimately bound down to adjacent structures, e.g. rectum, uterus, broad ligaments; these endometrial cells grow and produce small islands of endometrial tissue with glands and intra-glandular tissue indistinguishable from the endometrium itself. In time these glands acquire the menstrual function, and as they are blind this blood cannot drain away; in this way each gland forms a small blood cyst which enlarges each month as more blood is menstruated into it and so gives rise to acute pain during menstruation, followed by dull aching pain. Dysmenorrhœa of late onset with an indefinite tender swelling behind and to one side of the uterus are the most characteristic points in the diagnosis.

*Chronic cystitis*—This more commonly gives rise to frequent and painful micturition with acute pain in the hypogastrium and in the vagina. In a small percentage of patients with a very chronic cystitis this symptom of burning pain in the lower abdomen is complained of and so it must be borne in mind when investigating a case with this symptom. The diagnosis depends upon the presence of pus and organisms in the urine.

*Prolaps of ovary*—This, as would be expected, is often the cause of chronic pain, though it is more frequently referred to the back than the lower abdomen. Occasionally the meso-ovarian ligament is stretched so by the fact the ovary is prolapsed into the pouch of

Douglas even with a uterus in good position, but much more frequently the uterus is retroflexed. This position of the uterus not only increases the possibility of prolapse of the ovary, but aggravates the chronic pain owing to the weight of the uterus being continuously applied to the ovary. Dyspareunia is a common accompanying symptom and the diagnosis is easy as the tender ovary can be felt in the pouch of Douglas.

*Retroflexion of the uterus.*—The symptoms produced by this condition formed at one time one of the most vexed questions in gynaecology. Retroflexion was a comparatively easy condition to diagnose, and, as the early teaching was that any position of the uterus other than that of anteflexion and anteversion was abnormal, it naturally followed that any symptoms complained of by a woman with a retroflexed uterus must be caused by that retroflexion. Unfortunately, this condition was not only easy to diagnose but, in the great majority of cases, easy to treat and so it came about that, in one period in gynaecology, these unfortunate patients were condemned to wear pessaries and a gynaecologist could hardly consider himself fully established until he had attached his name to some modified type of this instrument; at a later period they were condemned to submit to some operation which fixed this unfortunate organ forward and offered the same facilities for modification and nomenclature.

Later came the reaction to this teaching, led by Donald, of Manchester, who taught that a mobile retroflexion was not the cause of symptoms and that if any were present they were produced by some concurrent conditions. This teaching is now generally accepted and although we must recognize that in a few cases a retroflexed heavy uterus does produce chronic pain and so call for treatment, these cases are rare, in the great majority the retroflexion is accompanied by some other condition which is really the cause of the pain—lax pelvic floor, prolapsed ovaries, endome-

tritis, etc. These remarks apply only to mobile retroflexion; a uterus fixed by adhesions will cause discomfort, not from the position of the uterus, but from the fixation. The effect of this old dogmatic teaching has not yet died out and a large number of patients with chronic pain in the back and lower abdomen are still condemned to a fixation operation, and many are sent to us labelled with this diagnosis and with a request to rectify it.

The modern teaching—and I believe the correct one—is that a mobile retroflexion seldom causes symptoms and that some other cause must be sought, but that, in a few cases, this position does give rise to symptoms and so, if no accompanying condition can be found, a fixation operation may be beneficial. In such cases the uterus should be replaced and held in position by a pessary and an operation subsequently performed only if the patient's symptoms are relieved by the treatment.

*Chronic endometritis*.—This is another controversial subject. If a uterus is of normal size or only slightly enlarged and the patient suffers from menorrhagia, dysmenorrhœa or chronic aching pain, for which no other cause can be found, a thorough curettage will often effect a cure. If each case is carefully investigated only a small number will be left in this category. Many gynecologists disbelieve that the endometrium is the cause of the trouble, but so long as these cases are cured by curettage it seems reasonable to assume that the endometrium is at fault. Although no one now believes that the endometrium is inflamed, it can be convenient to retain the old name of endometritis rather than coin a new one which may have to be altered again some time when our knowledge of the exact pathology is further increased.

*Subinvolution*.—The cause of chronic pain may be due to a variety of causes, and is not fixed. It is frequently found to be due to a lower position of chronic aching pain,

as this condition can only occur after parturition and so is often found in association with slight laxity of the pelvic floor. A uterus, a little enlarged, regular in outline, in a parous woman, is usually due to subinvolution.

*Varicocle of the broad ligaments.*—This is an interesting condition, to which Fothergill called attention in 1915.<sup>1</sup> He pointed out that this was a common cause of aching pain in one or both sides of the lower abdomen in women and that it frequently occurred in virgins and nulliparæ. The diagnosis, he states, can only be made by the exclusion of other causes of pain as it is not possible to feel the bunches of dilated veins during bimanual examination. It is very difficult to prove the presence of a condition which gives rise to no physical signs and, like many other gynaecologists, I was somewhat sceptical until in 1922 I had, in a period of seven months, three patients with such large swellings to one side of the uterus that I opened the abdomen with the diagnosis of "matted appendages" and in each case found a large mass of dilated veins in one broad ligament with normal ovaries and tubes. In each case I ligatured and excised the bunch of veins, but the subsequent history in each case was unsatisfactory and I had eventually to do a second abdominal section for each of them.

To have three such marked cases in such a short period proves that the condition does occur and in all probability Fothergill was right in stating that this condition occurs frequently in a minor degree, sufficiently marked to produce aching pain but not sufficient to give rise to physical signs. If a patient complains of chronic pain in the lower abdomen, relieved with rest and without physical signs or history pointing to any other condition, the pain is probably due to varicose veins in the broad ligament. The treatment is not satisfactory, rest is beneficial but is a treatment we must use with discretion in young patients;

was now curtted. I saw the patient at this stage and found the right kidney prolapsed almost into the iliac fossa and I suggested a kidney belt as the patient had had so many operations. A year later the patient again consulted me and told me that her doctor did not believe in belts so he had insisted upon fixing up the kidney a fortnight after she had seen me. I found the kidney was fixed, but in the iliac region, not where one would expect it and moreover there was a urinary fistula in the scar. When I saw her for the third time a year later the kidney had been removed and still the patient complained of chronic aching pain in the right lower abdomen.

This is an exceptional case but illustrates what may happen if very great care is not taken over the diagnosis. With such a symptom, produced by so many lesions and frequently exaggerated by the mental condition of the patient, we all make mistakes and I fear will continue to do so. All we can hope for is to reduce them to the minimum and we can only do this by bearing in mind the many conditions which produce this symptom when we investigate each case.

#### Reference

<sup>1</sup>Fothergill, W. P. "Varicocele in the Female," *Clin. Journ.*, 1915, xlv, 111

# The Diagnosis of Acute Appendicitis

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AN analysis of 70 cases of acute appendicitis, 35 being from the records of consecutive private cases and 35 from consecutive hospital cases, showed that in each group there were 19 which required drainage of the peritoneal cavity; in other words, 53 per cent. of cases in both groups had pus in the peritoneal cavity before coming to operation, as the following table shows:—

	Private Cases	Hospital Cases
Cases of acute appendicitis . . . . .	35	35
(1) <i>With pus formation</i>		
(a) Abscess present— appendicectomy performed . . . . .	14	15
(b) Abscess present— abscess only opened, . . . . . appendicectomy not performed	1	1
(c) With general peritonitis . . . . .	2	2
(d) With spreading peritonitis . . . . .	2	1
(2) <i>Without pus formation</i> . . . . .	16	16

This table shows clearly that cases of acute appendicitis still come under observation relatively late; usually this is because the family has made a determined onslaught on the disease before seeking expert advice. This misplaced purgative treatment usually intensifies its severity. Unfortunately, however, some medical men still feel justified in watching appendicitis in its early stages, diagnosing colic or gastritis. Gastritis is such a rare disease that it should be the last refuge of the diagnostician.

Every colic should be looked upon with grave suspicion; colic or pain traversing the abdomen from side to side or in the region of the umbilicus demands especially careful consideration. Only too often this is



can practically always say that it is a bilateral pain, even when it is almost localized to the umbilicus—is an important point in the differential diagnosis. It practically eliminates unilateral renal and ovarian lesions; its colicky nature and transverse character are against pyelo-nephritis. If, as is usual, this transverse pain is para-umbilical it is against cholecystitis; but if epigastric the diagnosis may be very difficult. In some cases of cholecystitis without jaundice the pain starts in a manner like that of the transverse pain of appendicitis, but it is somewhat higher and is followed by rigidity of the right rectus, pronounced throughout its length. The maximum tenderness may be below the umbilical level, owing to the close anatomical relationship of the gall-bladder and the appendix this is not surprising. Unfortunately, with unilateral pelvic disease this onset and, in fact, subsequent localization of pain make the differential diagnosis more difficult. On the whole the less acute onset, the absence of vomiting and the usually trilling character of pyrexia should incline the appendicular origin doubtful. Once doubts have been raised, a more thorough and systematic examination, physical and bacteriological (microscopic films), settles the problem.

I have seen two cases only of spinal disease mistaken for appendicitis. In both, the physical examination was the misleading factor. They both had severe rigidity and tenderness in the right iliac fossa, but in neither case was there fever or vomiting, the rigidity was such that the impression of a peritonitis so severe as to lead to tumour formation was present, and yet in both cases, under the anæsthetic, the iliac fossa went soft and free from thickening of any kind. In both the cases the muscular rigidity was entirely one-sided.

The anatomical relation of the cæcolium, the appendix, and especially of a retrocecal appendix, which may travel as far as the under-surface of the liver, explains why the inflammatory lesions of the

two structures may resemble each other. It is not the perforation of an ulcer into the general peritoneal cavity which causes the difficulty, but the local perforation. In most cases the differential diagnosis is simple, for the perforated duodenal ulcer has the picture of a supra-umbilical rigidity, and in the early stages absence of fever and a rather slow, shielded pulse. The history of a transverse pain coming about the umbilicus is absent. The following case is so instructive and emphasizes these difficulties of diagnosis so well that it may be quoted.

A man 42 years of age, well built, entered my ward at 10 a.m. with a history that he had suffered from duodenal ulcer with melena three years previously, for which he received prompt treatment with relief. The present attack began at 7:30 p.m. soon after his tea and about eight hours before he was seen by a doctor. Pain and vomiting dominated the picture, the pain began as a stomach ache around the umbilicus. On examination the abdomen moved with respiration. He pointed to the right iliac fossa as the present site of his pain where there was resistance on palpation. The liver dullness was present and there was not any fever. A diagnosis of acute appendicitis was made despite the absence of fever and operation decided upon. There was a period of waiting whilst an anaesthetic was found and during this time I remained with the patient and was struck by the severity of his pain. He writhed, cried out and sweated. This was not due to lack of fortitude, but was a measure of the severity of his pain, so striking was this that I came to the conclusion that an ulcer must have perforated. The absence of fever and the previous history of duodenal ulcer supported this view, and accordingly the abdomen was opened in the middle line. The first diagnosis, however, was right, no lesion of the stomach or duodenum was found but there was a distended appendix, a typical obstructive appendicitis. The history of duodenal ulcer associated with melena, the severity of the pain and the absence of fever suggested a perforation of a duodenal ulcer. On the other hand the definite localization to the right iliac fossa with the history, given by the patient, of the onset as a para-umbilical pain supported a diagnosis of appendicitis.

These cases of obstructive appendicitis are often characterized by the severity of the pain, as might be expected, and by the absence of fever until necrosis sets in, and a case like this shows, I think, how difficult the diagnosis may prove.

Now let us pass from the diffuse para-umbilical pain

of early onset to the more localized one. The diagnosis of appendicitis is seldom made until the pain has settled down in the right iliac fossa. When it does so there is usually with it a rise of temperature and a corresponding increase in pulse-rate. At this stage, whether or not vomiting has occurred, a positive diagnosis should be made and operation advised and even urged. To put it in a nutshell, a pain which starts diffusely across the abdomen, settles in the right iliac fossa, and is associated with rise of temperature, is due in the great majority of cases to inflammation of the appendix. The risk of leaving such a case is so great that if now and then it is due to other causes, usually surgical, no medical man can possibly blame himself for insisting on operation, when he so well knows the risk run by delay. I am more and more convinced that this is the right way to look at the matter.

The pain elicited by pressure on the abdominal wall, with the resultant resistance or rigidity of the right rectus muscle, is dependent on an inflamed appendix beneath, and the objection to having pressure direct or indirect applied to it. On the other hand, the localization of pain by the patient is dependent on a transmission from the inflamed or stretched structure through the sympathetic to the cord and thence through the spinal sensory nerves to a portion of the parietes. Now the nerve supply of the appendix is, on the whole, constant, so also is its co-ordination with the nervous system. The locality of the referred pain to the patient is the same therefore whether the appendix be just beneath the right rectus, retro-caecal or pelvic. This is not so, however, for the pain elicited by the surgeon's manipulations. If the appendix is under the rectus, so that the hand pressing down will directly or indirectly (through intervening or not intervening coils) press upon this inflamed appendix, then the parietes will go into contraction to protect it, and the abdomen feels the most tense or rigid, and draws in

own conclusion. But if the appendix is not so situated, if it be retrocæcal or well behind the mesentery or in the pelvis, then in the early stage, before the inflammation has become diffused, such palpation, not interfering or exerting pressure, causes no reflex protecting contraction, and the examiner finds no resistance or rigidity and is likely to be lulled into a false security. It is for this reason that so much emphasis is laid on a pelvic examination in a case of doubtful appendicitis, and in addition a palpation of the retrocæcal region, by pressing in above the crest of the ilium in the lumbar region, which may bring to light a tender and painful area. Let me emphasize these "blind" areas by a case.—

A young fellow, aged about 20, was vomiting freely and complaining of abdominal pain. There was no fever, the abdomen moved freely and could be freely palpated from the front. On palpating in the lumbar region the muscle was at once thrown into contraction and he winced with pain. It was possible to warn the doctor that he had a diseased appendix which was retrocæcal in position, but also that as he had this severe vomiting without fever it was probable that the case was one of obstructive appendicitis and that operation was urgently called for. Both these forecasts proved true.

It must be remembered here that it is in the early stages of the disease before it has passed outside the appendix, that in the retrocæcal and pelvic cases, palpation of the abdomen may fail to elicit pain, and movement of the abdomen be perfect. When the disease has spread outside the appendix to the neighbouring peritoneum any palpation in its neighbourhood will be painful and the forward spread from the retrocæcal locality or the upward spread from the pelvis will produce inflammatory changes in the right iliac fossa which are manifested by limitation of movement of the abdominal wall and tenderness on pressure. Analysis of cases of retrocæcal or pelvic appendicitis will show how seldom the right iliac fossa is painless. This is because [the disease has already spread; it bears out the statistics given above as to advanced disease and

*Bacillus coli* peritoneal infection. An interesting case which occurred many years ago shows the difficulties arising in diagnosis:—

A boy, aged 14 years, was taken ill with what was thought to be a bilious attack on the 12th of the month. There was no fever. He was given medicine and the bowels acted. On the 13th, at 10 p.m. his temperature was  $102^{\circ}\text{F}$  and pulse 120. There was no vomiting, the abdomen could be pressed upon from the front until the posterior wall was reached without resistance or complaint of pain, and rectal examination was negative. The diagnosis was uncertain, but he was sent into a nursing home for observation. Next morning at 10 a.m. his temperature was below normal, pulse 84, when seen by his practitioner and as there was no vomiting nothing further was done. Nearly 48 hours after my first visit there was relative rigidity compared with the other side and definite tenderness on pressure in the loins. With this history a diagnosis of retro-caecal appendix was made and at the operation a local collection of pus round a retro-caecal appendix was found.

This was a good example of appendicitis in what may be called a "blind" area. The absence of resistance in the right iliac fossa and of vomiting rendered the picture doubtful. What ought to have made one very anxious and justified immediate exploration was the rise of temperature and pulse following a purgative. The second day when the stimulating effect of the purgative had gone and absolute rest and rigid diet had produced a period of quiescence the "official visit coincided with a subnormal temperature" and a quiet pulse. I have seen this apparent normal temperature quiescence create a sense of satisfaction and ease of mind in the medical man which has lulled his anxieties to rest for a time. One of the lessons to be learned from a case such as this is the importance of temperature and pulse records and their comparison at intervals of at least twelve hours. Reference to vomiting and its significance will be made later. The history of the abnormally ill-tended's free movement with normal breathing when the appendix was undergoing inflammation will be recalled by the reader.

Before leaving the consideration of peritonitis it is well to note a few points of practical importance. It is of importance to determine the degree of the disease. In the

acute phase of pyelo-nephritis a cystitis is common and is associated with painful micturition. In a pelvic appendicitis, and especially if associated with a local peritonitis, contraction of the bladder may be painful. It may be the outstanding feature of the case when the appendix is inside the true pelvis, in contact with any distension of the bladder. The painful micturition of a cystitis from whatever cause comes at the end of micturition, when the inflamed internal surfaces come together, but in the painful micturition associated with a pelvic appendicitis the pain is often at the beginning, so that a history may be given that the patient holds water as long as possible because of the pain caused when the act is started. This pain is probably due to pressure transmitted to an inflamed appendix lying in contact with the bladder. When this is distended, the pressure of the contraction of the abdominal muscles, as occurs at the onset of micturition, must be appreciable in such an unyielding area as the pelvis. Painful sensation will thus be produced at the beginning of the act. In some cases the inflamed appendix is adherent to the bladder and pain will occur during the whole time of the bladder emptying.

Vomiting must be looked upon as one of the cardinal signs in appendicitis. It is fairly constant. Analysing 50 cases of acute appendicitis I found that vomiting occurred in 36, nausea without vomiting in 6 cases and no vomiting and no nausea in 8 cases. Nausea may be taken as equivalent to vomiting as a clinical factor so that what may be called the positive evidence is present in 84 per cent of cases. Its significance will thus be realized. From examination of numerous case-histories I should say that vomiting occurs in the early stages of the disease in the majority of cases, the usual history being that the attack was ushered in with pain and vomiting. Also it is well to remember that after this early onset of vomiting there may be no more until some complication, such as peritonitis or

obstruction sets in. This point should be emphasized because it is not uncommon to be told that vomiting has ceased, with the implication that any serious view of the condition may be put aside. On the other hand vomiting may set in late or it may persist throughout the illness. It may only be absent owing to a careful avoidance of any food or drink and in the absence of vomiting it is well to inquire on this point. A refusal of food because of a fear of vomiting is equivalent to nausea and should be looked upon as positive evidence.

The outstanding signs of acute appendicitis are abdominal pain, fever and vomiting. Absence of vomiting does not negative the diagnosis if other cardinal signs and symptoms are present, it calls for consideration and a review of other possible diagnoses, especially simple colic or renal, gall-bladder and pelvic lesions.

Fever, the third symptom, can be quickly dealt with. Its degree is of small moment. High fever may be present with a mild catarrh and slight fever, 99°-100° F., may be associated with gangrene. In the presence of abdominal pain, with the characters I have referred to, the occurrence of fever eliminates a colic and appendicitis should dominate the medical man's view, for some gross pathological change is almost certainly taking place in the abdomen.

Any one sign or symptom may be absent; it is possible that two may be absent; but from a long experience of the disease, I am sure that the clinical picture can be recognized in the vast majority of cases by consideration of a detailed history and a careful clinical examination. I would stress the importance of the search with particularity the abdomen, a "stomach" being pain, not limited to one side.

# Types of Acute Appendicitis

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APPENDICITIS easily outnumbers other conditions for which general surgeons operate, and a review of its characteristics is well merited from time to time. The etiological factors are still indefinite—no one cause or organism being specifically concerned. It is a somewhat recently recognized disease, first becoming prominent in 1895, since when it has been of consistently frequent occurrence. Its rise has been most marked in the cities and amongst the “better off” classes, whilst institutional inmates on plain diets are relatively immune. It is common in highly industrial and civilized countries, whilst in rural nations and native tribes living under native conditions it is still rare, but, if they take to “civilized” food, it becomes common. Similarly, in wild animals it is unknown, whilst amongst the captive animals at the Zoo, it is not infrequent. Generalities point to its being undoubtedly a disease of civilization, with its adequate supply of pure rich food of all descriptions. Sherren showed years ago, that it occurred in seasonal waves, especially two to three months after influenzal epidemics. It may occur at any age, it is rare in the aged, and most common in the second, third and fourth decades.

The exciting cause is elusive, occasionally thread worms, concretions, bristles and kinks are found in the appendix, but it is not usually possible to say what precipitated the attack. Quite frequently it occurs ten to fourteen days after tonsillitis and also after a large dose of purgative. The *Bacillus coli*, staphylo-



coccus, streptococcus, *B. Welchii*, tubercle bacillus and actinomycotic fungus have all been isolated from acute cases, occasionally in pure cultures, but usually the infection is mixed.

*Pathology and Types*—*Acute catarrhal appendicitis*, in which the inflammation is chiefly in the mucous membrane, which is swollen and congested with patchily distributed petechial hæmorrhages, and the organ is tense with blood-stained mucus. The muscular and peritoneal coats are at first unaffected, but later become reddened and swollen. The tip is often club-shaped, and distension is general or localized to the distal half or lower third. Occasionally, in severe infections, the appendicular vessels become thrombosed, then massive gangrene follows, and this is manifested clinically by a feeling of well-being, a fall to normal temperature (there being no circulation to carry the toxins away from the dead appendix) and pain is easier. This condition is well termed a "stage of delusion" and is only a temporary lull before a peritoneal storm of possibly fatal intensity. Resolution may be complete, no sign of the attack remaining, but usually some change remains in the shape of a fibrous stricture or an adhesion giving rise to a kink or twist, thus preparing future trouble, grading from the so-called chronic appendicitis to an acute fulminating attack.

A further development of this catarrhal condition may arise, if the lumen becomes blocked by the congested mucous membrane or by the swelling around a piece of faecal matter or a stricture, and appendicular obstruction is superimposed and, according to the contents of the appendix (chap. p. 159), a malodour, an empyema or gangrene will ensue, and the obstruction is overcome or the appendix removed by early operation. Seventeen years ago, D. P. D. White described acute appendicular obstruction; the first case, apparently, of fatal, chronic, but later relieved, disease, but ending in acute

appendicitis. It is, at first, a mechanical obstruction of the lumen and not an infection in the walls. It is predisposed by (a) Fibrous strictures of previous attacks, which become plugged by inspissated faeces or the ingress of intestinal contents, often after taking purgatives, a heavy meal or due to direct trauma or muscular straining. I have several times removed an acute appendix with a definite recent history of a blow over it. (b) Kinking or twisting of the appendix by bands or adhesions, again frequently the remnants of a former inflammation. Wilkie states: "In my experience, however, it has more commonly been a congenital fold attached about the middle of the appendix, fixing this part down toward the pelvis; this fold is almost certainly the genito-mesenteric fold described by Douglas Reid." Most surgeons are familiar with this fold and know the difficulties it occasions in appendicectomy.

It will be readily realized how these factors impede the passage of faecal matter in and out of the distal part of the appendix, and that once in, it is likely to remain, and become hard, when it will give rise to transient attacks of colicky pain until it grows large enough, by added layers, to precipitate a frank obstruction, when the appendix becomes distended with mucus and rapidly infected—usually by *B. coli* forming a living culture tube.

Wilkie's work on a dog's intestine shows what happens in such an obstructed appendix. In a dog, he isolated a loop of ileum and closed its ends, then reconstituted the lumen of the gut by end-to-end anastomosis. He found that. (a) When a loop was empty, it slowly filled with mucus, forming a mucocoele and health continued undisturbed; (b) when it contained faecal debris after a carbohydrate diet, in several days it gradually distended with pus, forming an empyema; (c) when full of faecal debris after a rich protein diet, it rapidly became gangrenous and

the animal died in 24 hours, of acute toxæmia.

A parallel can thus be drawn from this work and the sequence of events occurring in the above obstructed appendix, estimated. An obstructed empty appendix will develop a mucocoele, an obstructed appendix containing carbohydrate faeces will form an empyema, and when filled with protein residue, massive gangrene and general, probably fatal, peritonitis with severe toxæmia will take place. Recently, on opening an obstructed appendix (after removal) with the point of a scalpel its contents were under such tension as to splash five feet up the theatre wall, illustrating dramatically the catastrophe which would have been precipitated in the abdomen, had rupture taken place before or during operation.

Willac's work is most valuable and illuminating, and besides explaining the rationale of the changes in the appendix establishes an etiological factor regarding the effect of diet. It stresses the danger of the present-day tendency to excessive intake of meat and carbohydrate, which have only been possible during the last forty years with the advent of refrigerating ships for fruit and meat carrying and cheap beet sugar. Urgent gangrenous appendicitis is only seen amongst meat-eating people and is twice as common in the male as the female, this probably because the average man has a richer protein diet and is more liable to trauma.

*Acute appendicitis in obstructive appendicitis* usually begins in irritation of the mucous membrane opposite to a point of fecal faeces, when the inflammation rapidly spreads to the muscular and peritoneal coats, the inflammatory perforation into the peritoneal cavity by a point of rupture forming at the site. The course of the suppuration and the reaction of the body is determined by the situation of the perforation, which may be in the middle, opposite the cæcocolic appendix, or in the

pelvis, leading to abscess formation. (2) By the severity of the infection, a fulminating fatal peritonitis may ensue from a streptococcal infection, and the appendix appearing not grossly inflamed *B. coli* give a characteristic faecal odour and when smell is absent, except in the very early cases, advise a guarded prognosis, suspecting the presence of the deadly streptococcus

During the last three years, I have operated on 350 acute appendices: of these 127 were gangrenous or purulent, but unperforated, 70 had perforated and 93 were catarrhally inflamed, one of the last group, in a young woman aged 21, also showed a carcinoid growth of the appendix, emphasizing the value of a routine opening and careful inspection of the mucous membranes, all types of interesting items occurring

*The clinical picture.*—Acute appendicitis is initiated by general abdominal pain or discomfort centred round the umbilicus, better described by the patient as stomach-ache and is usually of gradual onset in appendicitis proper and associated with general malaise. This general pain is sometimes so slight as to be scarcely noticed by the patient unless cross-examined or may be very severe, they will frequently admit of a stomach-ache but not abdominal pain. I regard it as the essential preliminary to every attack of appendicitis. I have not seen a "true bill" without it—it ushers in primary and recurring attacks.

Nausea, retching or vomiting succeed or accompany abdominal pain and vary in their intensity. Patients usually vomit once or twice only; if repeated appendicular obstruction should be suspected or investigation made for another lesion. There may only be distaste for ordinary food, the patients only taking a glass of milk at their chief meal time.

The pulse and temperature are raised, the latter usually 99–100° F, if it is higher than 101° F (except in a child) carefully examine for a cause elsewhere

before diagnosing appendicitis, for example, pleurisy, influenza or pyelitis; in these, rigors usually occur, but seldom in appendicitis.

The pain, varying in character and place, may pass over to the left side, but ultimately settles down in the right iliac fossa, sometimes a little higher or lower, or through to the back according to the position of the appendix. In pelvic appendicitis, it usually remains lower abdominal and does not settle definitely in the right iliac fossa. This may be the case in appendicitis occurring in the latter half of pregnancy, when the uterus lifts the anterior abdominal wall clear of the inflamed organ and thus tends to mask the localizing signs until an advanced condition is present.

Headaches and pains in the back and limbs are usually absent, a referred pain in the testicle, along the same tenth dorsal nerve segment as the appendix, sometimes occurs; this suggests a renal lesion and emphasizes the necessity for microscopic examination of urine in all cases. A sudden cessation of pain and a feeling of well-being or marked improvement suggests gangrene or perforation with the relief of tension; this is often precipitated by the homely but dangerous doses of castor oil which cannot too heartily be condemned. The temperature and pulse temporarily approach normal and patients often get up, saying they are better.

Pain made worse on walking, or extension of the thigh, or causing a limp or sensation of weakness in the thigh suggests an appendix lying on the psoas, if it is lying on the bladder, it may give rise to frequent or painful micturition. A retroceded appendix may be close to the gall-bladder and so cause acute cholelithiasis. The bowels are usually constipated, but occasionally in pelvic appendicitis diarrhoea occurs probably from irritation of the peritoneum. After recovery, if the pain is left or recurrent, perhaps only passing on to the left side, the part of the psoas, the

is a positive sign; it indicates a reflex inhibition of bowel activity caused by the presence of inflammation in the lower abdomen.

The above history is constant in all true cases of appendicitis; it may be only elicited with difficulty, but it is present with modifications according to the infection, type of patient and position of the appendix.

Acute appendicular obstruction shows a different clinical picture. It is characterized by the sudden onset of severe, colicky, general abdominal pains, in spasms, sometimes doubling up its victims and causing them to roll about. It occasionally awakens patients asleep in bed. I have known two such cases sent to hospital as perforations. The restlessness is of diagnostic significance, it indicates a mechanical pain, whereas inflammatory pain usually immobilizes its victims, as inflammation supervenes, the patients gradually lie quiet and still in a position of greatest ease. The temperature and pulse are little disturbed at first; this encourages waiting and the diagnostic label of indigestion or intestinal colic (which it really is) especially if there has been any suspicion of dietetic indiscretion.

The absence of a raised temperature is baffling, and as much note is taken of this figure, perhaps too much so, it is essential to use a first-class tested instrument. Repeatedly, after seeing a patient, when the clinical picture has not agreed with the reported temperature (e.g. it has been stated to be normal when the symptoms and signs suggested it should be raised and vice versa), I have checked it by a tested thermometer I carry and have, many times, found it incorrect. The thick, cheap "two-minuter" as commonly used, especially in hospitals, is not trustworthy; it often takes longer than this to record and is difficult to completely shake down and read.

Retching and vomiting are repeated, whereas it is unusual for a patient with true appendicitis to do so

more than once or twice. The symptoms are purely abdominal at first, there being no signs of inflammation or systemic toxæmia, although the face is usually anxious. Often, careful inquiry will elicit a history of attacks of colicky pains, worse on the right side of the abdomen.

The picture of acute appendicitis with obstruction occurring afterwards is not so clear. The symptoms begin with those of acute appendicitis and, as obstruction occurs, the pain becomes severe, spasmodic, colicky and vomiting repeated. Perforation rapidly supervenes with the occasional "period of delusion," but a rising pulse-rate with general abdominal pain and increasing abdominal tension, indicate the onset of peritonitis.

*Examination*—The attitude and appearance of these patients is heavy, anxious and flushed; they lie still on their back, sometimes on their side with the legs flexed. The tongue is furred and moist, and the breath offensive. Active alæ nasi, labial herpes or cuneiform pallor suggest pneumonia, whilst cyanosis with dyspnoea with severe abdominal pain suggest a possible acute pancreatitis. The abdominal movement varies according to the severity and stage of the condition, sometimes its respiratory excursion is normal or is limited or jerky in the lower half. Later, part or all of it, becomes immobile, or in general peritonitis, the abdominal respiratory rhythm may be reversed, i.e. moving inwards on inspiration, outwards on expiration. This is a bad sign.

After inspection, ask the patient to blow out the stomach "like a fat policeman"; this gives an indication of the extent of the muscle and often causes the patient to lie down flat, or in a bed if the patient is unable to do it and in the very significant, vomit-free stage.

Here the patient is to be felt for with a special purpose. On the right side the superficial peritoneum

and apprehensive), stroking the abdomen in longitudinal and transverse directions, and also testing for sharpness of pick. In 10 to 50 per cent of cases, it is present in the right iliac fossa and is good supplementary evidence of internal pathology; it is said to be an indication of an unruptured appendix.

By now, confidence has been gained and palpation can be carried out on an assured and receptive patient, rather than on an apprehensive and defensive one; this is a most important point in an obscure case. Now estimate the tension of the recti with the flat flexor surface of the fingers (avoid a prod with the fingertips) and continue it into the flanks. This is a valuable sign—the difference is frequently slight but definite, and is better described as “guarding” rather than rigidity, it is a positive early sign and, maybe, the only one coupled with the history. A tense flank suggests a retrocæcal appendix. The right iliac fossa is usually painful and tender and shows varying degrees of muscle tension or rigidity centred half-way between the umbilicus and right anterior-superior iliac spine; it may prevent anything being palpated. Very occasionally the actual appendix can be felt sometimes, a softish, tender movable mass is palpable which is probably the appendix wrapped round by omentum and not yet adherent to the parietes and rigidity is not present. This tempts hesitation in decision, and the loss of some valuable hours, until the signs become more definite by the inflammation spreading, fixing the mass and rigidity occurring. In an established case of several days, a fixed abscess or mass may be palpable in the right iliac fossa, or occasionally in the pelvis on rectal examination.

The rigidity in the right iliac fossa is the response of the parietes to the close underlying inflammation. When the appendix lies retrocæcally, in the pelvis or behind the mesentery it is not present to such a marked extent, probably, only tenderness on pressure and





she was then lying down on a couch. He was worried "didn't like the look of her," so he saw her again at 10.30 p.m. before going to bed, and no material development having occurred, he advised hot fomentations. The temperature and pulse were still normal, the abdomen a little tender in the right iliac fossa, no more vomiting and the pain a little easier. At 11.30 p.m. he was sent for again. The patient felt much worse and finding the temperature 100° F., he asked me to see her. I operated at 12.30 a.m., removing a large perforated gangrenous appendix, evacuating much stinking, purulent fluid. This occurred in less than eight hours and it illustrates acute appendicular obstruction passing on to acute appendicitis, it shows the absence of change in the temperature and pulse, only slight physical signs and that once diagnosed, the treatment is operation.

A similar case was that of a man aged 60, awakened at 5.30 a.m. with severe abdominal pain and vomiting. He was sent to hospital as a perforated duodenal ulcer. His temperature and pulse were normal with a little tension in the right half of the abdomen and still severe pain. Operation at 9.30 a.m. revealed a tense mucocele of the appendix, the duodenum was normal. This case illustrates how severe and sudden in onset the pain may be, to cause the doctor to suspect a perforation. It is not often possible to foretell the pathology from the physical signs, which frequently hide gross pathology with slight signs and vice versa.

*Course*—In one, two or three days the symptoms may pass on to those of general peritonitis or completely subside, this meaning acute catarrhal appendix probably, or an appendicitis with a local abscess may now be forming, when the severity of the symptoms will ease but not completely, and a tumour form in the right iliac fossa, in the pelvis or in the loin. The pyrexia persists mildly, constipation will continue or diarrhoea may occur; occasionally frequency of micturition with the pain at the end, suggests the appendix adherent to the bladder.

In abscess formation, after the fifth or sixth day, the pain may become more severe as the tension in the abscess cavity increases, and according to its situation, it may track through the abdominal wall to the groin, burst into the rectum, vagina or general peritoneal cavity with disastrous results and signs of general peritonitis. A retrocæcal abscess may track up and form a subphrenic abscess later.

*Treatment*—The treatment of acute appendicitis is

surgical, and at once. The only contra-indications I know are cases of severe constitutional disease, like failing hearts, diabetes, nephritis, pulmonary tuberculosis, and overlooked cases with localized resolving abscesses. I am familiar with the school which watches appendicitis carefully and that it produces good results by medical treatment, but I am confident that surgical results are better, and a possible general peritonitis, suppurative pyelephlebitis or portal pyæmia avoided. I operate as soon as possible after diagnosis, and use general anaesthesia, spinal or local novocain infiltration according to the condition of the patient.

*Results.*—The average mortality of acute cases treated in the big London hospitals is about 4 to 5 per cent. Among my 350 hospital and private patients seven succumbed. The average length of stay for all cases in hospital was  $21\frac{1}{2}$  days, in catarrhal cases 16 days, in purulent and gangrenous but unperforated cases  $21\frac{1}{2}$  days, whilst in perforated cases it rose to 38 days, that is, double the time of the early cases, emphasizing the value of early diagnosis and prompt operation. I have seen almost all these cases several times since leaving hospital. In five cases—and these were all drained—there was an incisional hernia, the remainder being well. The length of time before operation did not bear any consistent relationship to the findings, unperforated cases existing after the attack had been in progress five days, whilst perforated cases occurred after eight hours. One patient died of intestinal obstruction 18 days after operation, he had a gangrenous appendix. Another had a perforated gangrenous appendix and died of a thrombotic embolism of the right femoral artery, whilst three died within 24 hours of operation of toxæmia—they were all babies. One of the patients survived later, and one of perityphlitis.

# Prognosis in Diseases of the Heart

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WHEN forming a prognosis in any given case of heart disease, the most important thing to be clear about is the cause of the cardiac lesion. Broadly speaking, we may divide cardiac affections into those which have been caused by rheumatism, chorea or scarlet fever, on the one hand, which manifest themselves in comparatively early life, and those which are due to degenerative and arterio-sclerotic conditions, or to syphilis, and which do not, as a rule, appear till about middle age. From the point of view of prognosis, it is more important to decide from which of these causes the cardiac lesion has originated than which valve is affected. Speaking generally, the prognosis is much more favourable in the rheumatic cases, where the lesion is apt to become stationary, whereas in the arterio-sclerotic and syphilitic cases the lesion is likely to be progressive. In very young children, however, though the lesion is nearly always rheumatic in origin, the outlook is generally serious, because so often the pericardium and myocardium as well as the endocardium are affected and there is in fact a "pancarditis."

## AORTIC DISEASE

Here the difference between that form of the disease which is due to rheumatism and that which is of degenerative or of syphilitic origin is most striking. The main point to realize is that the aortic disease of the rheumatic patient, apart from the risks of further

attacks of rheumatism, might be described as a static lesion, which carries with it a very favourable outlook not only with regard to length of life, but more particularly from the point of view of the amount of work which can be accomplished. This is the cardiac lesion in which the capacity for work is greatest. During the great war, it was surprising how often one encountered cases of aortic disease, which had slipped through the vigilance of the medical examination at recruiting and had yet carried on successfully in the infantry, only having to go into hospital on account of some surgical condition, or some fever, such as malaria, when the cardiac affection was accidentally discovered. From the public health and economic point of view, patients with this kind of lesion are capable of doing quite a good deal of work. Though, doubtless, handicapped in the race of life they need not follow a purely sedentary occupation, provided reasonable attention is paid to the nature of their work, to regularity of hours and to the way in which the unoccupied hours are spent.

Turning now to the arteriosclerotic form of aortic disease, here the lesion is almost necessarily progressive, though, with careful treatment, it may remain stationary for a time, but it can never really improve, owing to the changes which are fairly certain to have taken place in the coronary arteries. It is the changes in the coronary arteries which give rise to the most serious symptoms connected with aortic disease—namely, angina pectoris, which is serious, not only on account of the severe pain and alarming condition of the patient, but because it indicates the probability of considerable degeneration of the cardiac muscle and the consequent likelihood of sudden death. In the chronic forms of aortic disease, which are syphilitic in origin, one should be specially careful to give a most careful prognosis, for though the symptoms in the early stages may be considerably alleviated by anti-syphilitic

remedies, there seems to be a special liability to sudden death, owing to the fact that much of the myocardium no less than the aorta has been damaged by the syphilitic virus. there is, too, in these cases the likelihood of an aortic aneurysm developing

As to the physical signs in connection with the prognosis of aortic disease, as a rule it may be said that the more collapsing the pulse the greater will be the regurgitation. Changes in the character of the murmurs are generally not of much importance, alterations in the cardiac dullness are more valuable, an increase in the transverse area of dullness being usually a bad sign, whereas an increase vertically is probably a good one. When the second sound in the aortic area and over the carotids is entirely obliterated by the diastolic murmur, it undoubtedly indicates that the amount of regurgitation is considerable, and to that extent the prognosis is bad.

#### MITRAL DISEASE

Here the association is nearly always with rheumatism, and mitral stenosis seems in particular to follow the less pronounced forms of rheumatism such as vague, indefinite pains in the limbs or stiff neck. As is now well known, this lesion is much more common in women than in men and for a long time may not give rise to any serious symptoms. Perhaps, owing to the greater tranquillity and more sedentary character of the lives of women, they may be less affected by the existence of the lesion than are men. In these cases the heart, as the French say, is *réglé pour un petit travail*, and with reasonable care such hearts may carry on for a long number of years and the condition should not necessarily be a bar to marriage or pregnancy. But when once the heart in these cases has begun to fail, its efficiency is not so easily restored. The narrowing of the mitral orifice causes an imperfect filling of the left ventricle, consequently the heart

obtains an insufficient supply of blood, so that cardiac weakness is thereby promoted. Mitral stenosis when established in late childhood has a more serious prognosis than when it occurs first in early adult life; this, doubtless, is partly owing to the fact that the stenosed orifice does not increase in size while the growth of the heart continues. These cases seldom reach the age of forty. An unfavourable feature is the development of catarrh of the bronchi and the more extensively the finer bronchi are involved and the more diffusely the process has extended the worse will be the prognosis. Hæmoptysis, however, is not necessarily a serious sign.

It must further be remembered that it is especially in the cases of mitral stenosis that auricular fibrillation is most likely to supervene. Much less common, of course, are the cases of mitral stenosis associated with arteriosclerosis. These necessarily have a less favourable outlook than the form we have just been considering, because here the lesion is progressive. It is in this form of mitral stenosis that thrombosis is most common, whereas embolism is more characteristic of the rheumatic form, giving rise, if pulmonary, to infarcts, while, if cerebral, causing hemiplegia.

#### MITRAL REGURGITATION

When of rheumatic origin and unassociated with stenosis, mitral regurgitation is far less common than was formerly supposed, because regurgitation used often to be diagnosed when there was little evidence of it beyond a systolic murmur at the apex. In early life the main danger is the liability to further attacks of rheumatism, which may render still worse the existing lesion which already exists, but with the lapse of years this liability becomes less.

The most satisfactory thing about mitral regurgitation is its amenability to treatment. Again and again the patient may break down temporarily with

a widespread cedema, yet again and again by rest and judicious treatment the patient may be restored to his former level of health. It is this power of recovery under treatment which has given to mitral regurgitation, when of rheumatic origin, its traditional and justly favourable prognosis. When, however, this lesion is of arteriosclerotic origin the prognosis is obviously more serious, for here we are no longer dealing with a quasi-mechanical valve lesion, but the valve lesion is part and parcel of a wider whole; the heart muscle, the arteries, and, it may be, the kidneys, being affected in one way or another, so that there is a most definite limitation to a patient's activities and the span of life is materially shortened.

#### AURICULAR FIBRILLATION

Of this condition much, of course, has been said of late years and it would almost seem to have taken the place of valvular disease as regards importance among cardiac lesions. Doubtless, until comparatively recently it was customary to give a very unfavourable prognosis in cases of auricular fibrillation, but this was because the first descriptions of the condition were taken from very serious cases of mitral stenosis when the heart was obviously failing. We now realize that fibrillation of the auricles may occur in other conditions, such as arteriosclerosis and in mitral cases, which are far from being very advanced. Though auricular fibrillation may start fitfully at first, and in fact paroxysmally, when once it has definitely set in it will usually continue for the rest of the patient's life. Since the condition is associated with a rapid and irregular action of the heart it necessarily tends to embarrass the efficiency of that organ and the prognosis depends on how far the heart can carry on its work with such an altered rate and rhythm. The normal activity of the auricles is not essential to the efficiency of the heart, but the fact of their being



diseased suggests that changes have also occurred in the cardiac muscle of the ventricles and it is this which finally causes a fatal issue. If in any given case we could be reasonably sure that the disease was confined to the auricles we should be able to give a much more favourable prognosis. This is the reason why the condition of auricular fibrillation has such a varying outlook—it is essentially a lesion of the auricles, but we have no sufficient means at present of being certain that the damage is confined to them and has not extended to the ventricles.

Fortunately it is just in these cases that digitalis proves most effective, and especially when the fibrillation of the auricles is connected with mitral stenosis of rheumatic origin the drug seems to act almost as a specific. Consequently by a judicious use of this remedy and, in certain cases, of quinine, together with rest and a generally restricted mode of life, cases of auricular fibrillation may live on for many years, particularly if it has been found possible to avoid exhausting the ventricular myocardium by keeping down the ventricular contractions to about 70, but, of course, such patients will have passed definitely to a lower plane of activity.

On the other hand, auricular fibrillation occurs also not infrequently in cases of arterio-sclerotic condition of the heart, here we have the older type of patient to deal with and, as a rule, the fibrillation is of more moderate grade and the patient may seem to be less affected by it. Unfortunately these cases do not respond so well to digitalis as do those of rheumatic origin in younger subjects. In such patients, then, the prognosis depends rather on the general cardio-sclerotic condition of the heart and blood vessels than on the auricular fibrillation *per se*.

#### MYOXYMATA

As it regards the cause of valvular conditions which

we have been considering there lies the question of the state of the cardiac muscle, which may be seriously damaged without necessarily giving rise to any very obvious physical signs. Of recent years great attention has rightly been directed to the condition of the heart muscle in prognosis, but it is a mistake to suppose that this is an entirely new conception. Laennec himself had realized the importance of the cardiac muscle, regarding it as the key to cardiac pathology, and, he might have added, to the prognosis of heart disease. Stokes, too, said: "It is in the vital and anatomical condition of the muscular fibres that we find the key to cardiac pathology. for no matter what the affection may be, its symptoms mainly depend on the strength or the weakness, the irritability or the paralysis, the anatomic health or disease, of the cardiac muscle."

Often the history of the patient is a more useful guide to the prognosis than are the conditions present at the moment. The younger the patient the better on the whole is the outlook, as there is less likelihood of serious degenerative changes having set in, after middle age such changes are usually present and cardiac efficiency is seldom then re-established after it has once seriously given way.

The collection of numerous clinical details, both signs and symptoms, is comparatively useless in estimating the prognosis unless we can form some adequate picture of the cardiac muscle at its work. For instance, is the income and output of the heart just balanced, or is there a substantial reserve? If there is a reserve, is it disappearing, and how fast is it disappearing? We are too much in the habit of taking one lesion of the heart, it may be aortic regurgitation, or mitral stenosis, or auricular fibrillation, and basing upon it our diagnosis, instead of regarding each of these separate structural lesions as a part of the cardiac apparatus which is impaired and estimating how much

of the remainder is intact and healthy and capable of carrying on the necessary requirements of the circulation.

At present we have no means of mechanically estimating the efficiency of the myocardium. The effort syndrome is certainly helpful. An electrocardiographic tracing which shows an inverted T wave in Leads I or II gives us definite evidence of some myocardial degeneration, but does not enable us by itself to form a precise prognosis.

Stokes-Adams disease and pulsus alternans are of grave prognostic significance, also when myocardial degeneration is associated with chronic nephritis the outlook is bad, above all the development in these cases of a cantering rhythm at the apex, implying that the ventricular wall is subjected to a strain to which it must necessarily yield, indicates that the end is not far distant. On the other hand, a myocardium, though greatly damaged, may continue to perform its functions fairly well, provided no extra burden is put upon it. Any illness, especially acute infections, such as influenza, may prove the last straw.

When the changes in the heart muscle are fatty rather than fibroid the prognosis is very serious; the more corpulent the individual the worse is the outlook, since it is hardly likely that the obesity can be reduced without damaging the nutrition of the heart muscle. The prognosis will usually be better when the myocardial impairment appears to be due to some rheumatic antecedent, because in these cases the lesion is more likely to remain stationary, whereas when due to arteriosclerosis the outlook is definitely worse, because here the lesion is likely to be progressive. Intermediate between the two cases is syphilis; here, too, the lesion is apt to be progressive and to affect a large part of the myocardium. At the same time, if the disease is treated early and active anti-syphilitic treatment is given, the prognosis may be much better.

than in that of the arteriosclerotic cases.

#### MARRIAGE AND PREGNANCY

Here, of course, we are in the main consulted by youngish women with mitral stenosis and, undoubtedly, of late years experience has demonstrated that marriage is far oftener permissible than would have been thought advisable a generation ago. A woman with mitral stenosis should be permitted to marry and have children, when there has been no history of heart failure and when the initial rheumatic attack has been some years before and there has been no recurrence of the infection. If there has been such a degree of heart failure as to involve being in bed for several weeks, then marriage should certainly not be allowed, and well-established auricular fibrillation should be a bar to pregnancy. Patients with aortic disease seldom appear for an opinion on this question, but when the lesion is of rheumatic origin and there has been no cardiac failure, in my experience marriage is quite permissible.

#### ANÆSTHETICS

Cardiac patients, provided there is not much myocardial damage, bear anæsthetics remarkably well, when they are carefully administered. A mixture of chloroform and ether seems preferable to either alone, ether alone is apt to produce pulmonary congestion. Whatever anæsthetic is used, oxygen should be given with it if the operation is at all prolonged, also it is important for the patient to rest in bed for a few days prior to the operation.

#### CONCLUSIONS

In nearly all cases of heart disease the question of heredity and the family history are most important guides to the prognosis. There are some families whose members seem to have a myocardium which

of the remainder is intact and healthy and capable of carrying on the necessary requirements of the circulation.

At present we have no means of mechanically estimating the efficiency of the myocardium. The effort syndrome is certainly helpful. An electrocardiographic tracing which shows an inverted T wave in Leads I or II gives us definite evidence of some myocardial degeneration, but does not enable us by itself to form a precise prognosis.

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# Adolescence and Psychological Medicine

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BY virtue of his unique position in the social order the family practitioner is apt to be consulted upon matters which, in their essence, are not strictly medical. Of these none are more important than the problems of adolescence. The stammerer, the bed-wetter, the masturbator; the precocious child, the "difficult" child, the child with fears; the bad-tempered girl who is out of control at home, the young person who does not make any progress at school, the truant, the vagrant; the public schoolboy threatened with expulsion for pilfering or his less fortunate brother who has been charged with theft at the Juvenile Court; the young man who retires into a world of his own, or who naively imagines that money would provide the solution of all his difficulties, the aloof adolescent who has no friends, the young cocktail addict, or the boy who lives in constant dread, the result of some unfortunately acquired sexual knowledge; by these, and many others, may the medical adviser be confronted. This article aims at describing the method by which such problems may be attacked and elucidated, and a diagnosis, prognosis and plan of treatment satisfactorily evolved. The methods here described are those which we have found valuable because of their applicability to the most diverse problems, and the varied circumstances in which they arise, whether in private, hospital, or clinic practice.

Among the many interesting trends which characterize psychological medicine at the present

day, there is none more fascinating, or more far-reaching in its possibilities, than the study of personality. It has come more and more to be recognized that many "mental" and "nervous" breakdowns should be regarded primarily as a failure of the individual to cope with the stresses of life—a state of imbalance in the reaction between the whole personality on the one hand, and the environment on the other. The advances of knowledge and thought that have been made during the last fifty years in the spheres of both psychological medicine and sociology have done much to define the facts, and to throw light upon the problems they embrace.

And what of youth? We are accustomed to regard adolescence as the time during which the immature personality, as it were, gradually crystallizes into its adult form. The potter must fashion while his material is malleable, and for the psychiatrist the period of adolescence is big with opportunity as being the time at which the personality is taking shape before it sets finally in characteristic mould. During this period, if the individual is to adapt to adult life, very rapid development and adjustment must take place and for this reason the process of adolescence is both a fearful and a wonderful one.

Owing to the march of civilization, the problem of adaptation to life is becoming increasingly urgent. Human life, though perhaps no harder in its material conditions than a hundred years ago, is, from the psychological standpoint, infinitely more complicated. The pace is faster. The individual is subjected to stresses of increasing subtlety—speed, noise, competition—to name but a few. This article is a plea for what may be called the "personality approach" to psychiatry.

#### STATEMENT

The preliminary remarks lead up to a consideration

of personality itself and of the armamentarium, both inherited and acquired, with which the normal individual is equipped for facing the battle of life.

For clinical purposes it is convenient to conceive any given personality as being composed of four main elements: (1) Ego. (2) Temperament. (3) Intelligence. (4) Character.

(1) Under the expression "ego" are grouped all the mainsprings of human endeavour. These are the instinctive tendencies, the *vires a tergo*, the vital urges which drive the individual to maintain his existence and to propagate his species.

(2) The "temperament" is, as it were, the pattern according to which the instinctive energy is expressed. Temperament is innate, and, though it is capable of considerable modification, it has a physical basis, and stamps its impression upon the whole personality.

(3) By "intelligence" is meant, not knowledge or wisdom, but the innate capacity to profit by experience. Intelligence is the lamp which illumines the path through life, to the intricacies of which our energies and temperament must adapt with either a greater or less degree of success. The factor of general intelligence is becoming to an increasing extent a measurable quantity.

(4) In the process of adaptation there is formed the quality known as "character." The measure of character formation is the measure of the individual's power to overcome difficulties, the measure, whatever his material successes or failures may be, of his success as a whole personality. It will be understood, however, that the term character is not used in the sense indicated in the phrase "he's a character," a sense in which "character" and "personality" are synonymous terms.

Such being the framework of personality, the next step is to observe how the structure will be affected by the gusts of adolescence. During this period the



to the working out of the full psychiatric situation, and it must not be taken for granted that a physical condition precludes the presence of psychological factors. It is not the function of this paper to indicate the stages in obtaining a psychiatric history of the patient, of his achievements and failures, of his family and the features of his environment, though knowledge of this background is indispensable to a complete picture of the personality. In approaching the personality itself, it is useful first to assess the level of general intelligence because this investigation will give information relative to ego and temperament that will prove of the greatest material value. In many cases it is sufficient indication to obtain some record of scholastic progress, though this must be studied in its widest and most inclusive sense. Where the problem is intricate, and in all cases where the school record is uniformly bad, recent scientific methods for assessing general intelligence should always be applied. Investigation of intelligence will either exclude altogether the intellectual a contributory factor to the problem, or it will throw considerable light upon the cause of the behaviour disorder.

Character development demands special study, and here, too, opportunity for observing ego and temperamental factors will be provided. The degree of character development may be arrived at by putting a carefully thought out system of question to the adolescent concerned, and noting the response. To present some definite question to the patient, and to require how he would act under the circumstances is not a suitable method for assessing character. The responses to such tests are liable to be directed by the subject, rather than the personal material, which is why a system, person by a given form of conduct is more involved. Ideal responses can be put, and the subject to the type of test is usually self-exposed. The ego factor may be assessed in the

course of the interview, if it has not already revealed itself in the history of the case. "*I know.*" "*I can do it.*" "*Let me.*" are common remarks on the lips of the child with a pronounced ego, and, though modified, are evident in the adolescent as "*my opinion.*" "*my view.*" "*I think.*" and the like.

Temperament, also, should it have positive significance as a contributory factor in the problem, will have revealed itself during the interview. If the temperamental pattern has not shown itself in sufficiently high relief to claim the psychiatrist's attention, he may rest assured that this is not the source of disquiet.

*Diagnosis*—During the investigation certain definite disorders or well-recognized states of mind may exhibit themselves and immediately supply a solution to the problem. Among the more common physical diseases which simulate mental trouble and which are, therefore, liable to come within the psychiatrist's purview, are chronic epidemic encephalitis of insidious onset, in which the primary disease has escaped notice, the prominent feature being that of mental or behaviour disorder, chorea, which in the acute stage may manifest itself as a mental illness, and during which, unfortunately, patients are liable to be placed under care with a view to certification; early disseminated sclerosis, or cerebral tumour interfering with higher mental function.

Among the true psychological diagnoses we find characteristic disturbances in the realm of each of the factors of personality. Under disturbances of ego may be found those conditions in which there are ideas of inferiority or superiority, the "*inferiority states*" The term ego is sometimes taken to stand for positive assertion, but many failures in personality can be ascribed to lack of adequate development in the normal assertive tendencies. In the realm of temperament,

our studies become particularly interesting. During adolescence it is essential for the welfare of the individual that temperament should develop evenly and at a normal rate. A transient period of adolescent instability is, however, of common occurrence, and is responsible for many of the emotional outbursts, foolish escapades, hysterical manifestations, and episodes of abnormal behaviour which occur in young people. The adolescent passes through a difficult time when internal developmental stress is in process of adaptation to external environmental circumstances. At this time, a curious anomaly of reasoning power is frequently seen. The patient is inclined to be impatient of human shortcomings, intolerant of his elders, resentful of authority, but is quite incapable of realizing the simple economic facts of material existence. Prompted by instinctive urges, he may act unwisely, or form some undesirable sexual attachment. Such behaviour is rather the outcome of romantic, though mistaken, notions, than evidence of abnormal anti-social or vicious tendencies, and of which, after the lapse of a few months, the individual would not have deemed himself capable. In short, they indicate a temporary lack of balance due to an insufficient check being placed upon temperamental and ego factors by the developing character and ripening intelligence. Such, then, are examples of temperamental inadequacy in its milder and more transient forms.

It is when we consider the more extreme forms of temperamental pattern and instability that we are upon the fringe of a new classification of mental disease. The terms *extroversion* and *introversion* were introduced by Jung to describe temperamental extremes. This conception, obvious though the objection to it may be, has contributed greatly to the clarity of our thought upon the matter of temperament. The *extrovert* is characterized by

readiness of response and reaction to environmental stimuli, warmheartedness, and a tendency towards the continuous expenditure of energy. The introvert, on the contrary, is inclined to be cold, aloof, detached, "shut in." He tends rather to conservation of energy and to preoccupation with his own thought. Evenly balanced temperaments are those in which extroverted and introverted tendencies are in satisfactory combination. Any deviation towards either extreme may tend in the direction of a psychosis. At one extreme, that of extroversion, and cyclothymia, there is the whole range of what have been called the affective reaction types, the manic and depressive states. The keynote of these conditions is instability of affect, thought and conduct being dictated by the emotions. At the other extreme stands pronounced introversion which tends in the direction of schizophrenia or splitting of mind. Under this heading fall many of those cases which used to be called dementia precox; the terms dementia paranoides, paraphrenia, paranoia, though not originally so intended, correspond roughly to various age groups in the whole class of schizophrenia.

The flushed, over-active, restless child whose mind cannot apply itself to one interest for more than a moment or two, who is constantly distracted by some new game, new idea, new plan, new playfellow, and immediately allows the former ones to fade from his mind with no apparent regret, who prefers to play with others or to be entertained, is an extrovert, a potential case of manic-depressive psychosis, and we have seen such at the age of seven years, practically hypomaniac in behaviour. The pallid, quiet, inert, unresponsive, unfriendly child, who appears lazy, dreamy, unintelligent though precocious, tardy in thought and action, who prefers to play by himself, or at some set game, is in reality a pronounced introvert, a potential schizophrenic.

The importance of the intelligence factor in diagnosis

cannot be over-estimated. In those cases where investigation of intelligence reveals extremes of intellectual development, whether above or below the average, it is essential that the features of the problem should never be considered apart from the mental age of the patient and his intelligence quotient. It is common for adolescents to be referred to as lazy, irresponsible, thoughtless, whereas examination shows that they have not, and never will have, their full complement of intelligence; the whole prognosis and plan of treatment in these cases depend upon the diagnosis in terms of mental age as distinct from the chronological age.

Finally, a certain number of the difficulties of adolescence will have to be considered as inadequacy in character development. It may be owing to adverse environment, lack of precept, laxness in discipline, that the deficiency has been acquired, and is, on this account, remediable. For the purposes of diagnosis, therefore, environmental influences must always be taken into account before the case is labelled as one of moral defect. But, unfortunately, a certain number of these cases would appear to be innately deficient in their ability to develop character and should be selected for stricter measures of control in order that much juvenile crime and recidivism may be prevented.

*Prognosis.*—There is no period of life at which a correct prognosis of more vital importance than during adolescence. The parents are concerned to know, and they urgently enjoin the doctor to foretell, what the future holds, whether with regard to health, earning capacity, social relationships or parenthood, and what future liabilities the problem may entail.

It is hoped that what has already been said of the "prognostic approach" leads up to a conception of prognosis as being rather the end-result of a scientific

chain of reasoning, than the empirical fruit of individual experience, or speculation that is purely psychopathological. Having arrived, in each case, at the etiological factors that are contributing to the problem, and knowing, as we do, a considerable amount about the function and powers of development of each factor of personality, we move inevitably towards such logical and inescapable conclusions as are pointed by the facts. Take but one example, that of stealing. The offender may be unable to realize the nature or quality of his act, he is defective in intellect. It may be that, although of normal intellectual development, he is morally defective, incapable of developing a sense of right or wrong. It may be that theft is a reaction to some physical or material deprivation in his home surroundings; the result of instinctive self-assertion, the outcome of an urge to express himself; or an attempt at self-display; a preliminary to the generous gesture of purchasing a gift for purposes of obtaining the admiration, flattery or affection of others; finally, it may be due to impulse or obsession, the manifestation of some serious mental disturbance.

So diverse, then, are the motives for theft, that the chances of a recurrence in any one individual cannot be permitted to remain a matter of guesswork.

The "personality approach" yields a solution and a prognostic picture that carries with it, not only a sense of scientific achievement in the mind of the physician himself, but enables him to put the parents in complete possession of the facts, whether grave or hopeful, and at the same time render a valuable service to society.

*Treatment*—Throughout medical practice, elaborate investigation, diagnosis, and prognosis is of little avail save it is crowned by the appropriate remedy. Each case must be dealt with individually and upon

its own merits, but all treatment of these adolescent disturbances may be divided into three categories:— (1) Complete change of environment (2) Modification of present environment (3) Treatment of the individual personality.

(1) Change of environment may be demanded, either because the environment is so unsuitable that a normal adolescent could not reasonably be expected to adapt to it, or because the patient's defects are such as to render him incapable of adjusting to the environment of his more normal fellows. The case may require removal to a mental hospital, a training school, an institution for defectives, a mental home, a colony, a farm, or different home surroundings. Change of environment is never to be recommended as a last resort where detention or punishment is the sole aim, but only when it is positively the best remedy. Further, it must be ascertained that the atmosphere of the chosen environment reflects the light of modern knowledge, that the patient will receive individual understanding, and that a constructive effort will be made towards utilizing what powers he possesses, with a view to his return to social life as an economic unit.

(2) It may be necessary to undertake the task of modifying the present environmental circumstances in order to bring about a successful adjustment. In addition to the problem itself, there may have grown up a situation that is based upon misunderstanding on the part of the patient and of those with whom he is associated and related. By patient effort it is often possible to eliminate these prejudiced, antagonistic, or defensive attitudes and re-establish sympathetic contact between the parties concerned. No pains must be spared to secure the understanding of all those in daily contact with the patient—parents, relatives, teachers, or intimate friends—in order that all may cooperate in bringing about a satisfactory adjustment.

(3) It must be recognized that the patient would be

excused from bearing the burden of his own difficulties, while being treated with leniency and forbearance by all about him, it must be made clear that such is very far from being the case. The whole future depends upon the capacity of the individual to shoulder his own burdens, and, although there are cases in which this is manifestly impossible, where the patient possesses adequate mental equipment psychological treatment provides the means of accomplishing this end

It may seem surprising, but, in practice, it has been found that by means of skilled personal contact the adolescent shows a remarkable ability to obtain insight into his personality, and understanding and mastery of his problem. He is easily fired by an inspiration that will carry him forward, at the moment when his courage and character would tend to falter. His ideals can be applied to the problem, and to correcting the faults in himself which he can be brought to realize

Treatment based upon a scientific study of personality has very vast advantages over the rule-of-thumb methods that have existed heretofore; methods based solely upon punishment, methods that consisted of moralizing and preaching, methods confined to sympathy and encouragement, all of which are of value in themselves but ineffective when compared with the "personality approach" which is not only sound theoretically and applicable practically but amply justified by results.



# Internal Derangement of the Knee Joint

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**T**HIS term should be only used to include intra-articular lesions occurring in a previously healthy joint, which are directly attributable to injury. Thus such conditions as separation of osteophytes in cases of osteoarthritis are excluded.

The term "internal derangement" is applied only too often as a convenient label for cases of injury followed by somewhat obscure symptoms and signs. Frequently a more careful history and examination would result in accurate diagnosis and appropriate treatment. It is sad to recall the numbers of cases, the majority of whom were potentially healthy wage-earners, who have wasted months with local applications, when it should have been obvious from the first that some manipulative or operative procedure was essentially the first step in treatment. Conversely, an ill-advised operation may further damage a deranged joint, and in addition to wasting the time of the surgeon and patient, tends to bring surgical measures into disrepute.

The injuries which produce internal derangement may be classified according to the structure involved, and therefore comprise the synovial membrane, ligaments, cartilage, bone, and loose bodies in the joint cavity.

(1) *Synovial membrane*—The synovial membrane of the knee joint is extensive and complicated, the anterior part being of special surgical significance. From the antero-inferior part of the joint a triangular fold passes upwards and backwards to be attached to the anterior extremity of the intercondylar fossa. The fold is known as the *Ligamentum mucosum*, and is for the most part beyond the beam of the light.

Synovitis following injury results in thickening of this synovial fold with consequent increased risk of its being nipped between the condyles and the tibia. This tendency is accentuated by associated oedema and swelling of the pad of fat which lies behind the patellar ligament, as when this fatty pad is increased in bulk the unyielding ligament in front necessitates a backward bulging. This results in the synovial fold being pushed farther back into the knee joint with a consequently greater likelihood of being nipped. Thus, a vicious circle is set up—synovitis of the knee causes swelling of the synovial membrane and infra-patellar fatty pad; this tends to displace the synovial membrane backwards so that nipping is likely to occur, nipping causes a further inflammatory reaction and thickening of the synovium and fat.

A recurrence of these conditions may result in fibrosis of the synovial membrane and permanent thickening of the fatty pad. If the condition is allowed to persist degenerative changes eventually supervene, which may culminate in osteoarthritis of the joint.

Thickening of the synovial membrane follows a traumatic synovitis, which is a common result of a wrench or sprain. The associated synovial effusion obviates nipping as it distends the joint and therefore prevents the synovial membrane from slipping in between the condyles of the femur and the tibia. It is when the effusion diminishes that nipping is likely to occur, as oedema of the synovial membrane and peri-synovial fat requires longer to absorb than free fluid in the joint. Consequently all cases of synovitis should be treated by prevention of flexion of the joint until not only has fluid absorbed, but until thickening of the synovial membrane is undetectable. In the early stages of cases of traumatic synovitis the patient should be confined to bed and cooling lotions and a firm bandage applied. After two or three days the patient may be allowed up with a posterior wooden

or poroplastic splint, and massage applied to the joint and quadriceps muscle, and counter-irritants applied. If progress is satisfactory a Scott's dressing and strapping are applied after about fourteen days, and by this time the effusion has usually disappeared. The dressing is changed weekly and the condition of the synovial membrane, which is readily palpable on either side of the patellar ligament, is noted. When no swelling can be detected, usually about a month after the injury, the strapping is replaced by a crepe bandage and flexion gradually permitted.

If treatment is inefficient recurrent attacks of pain occur referred to either side of or behind the patellar ligament (Fig. 1). These attacks are not usually

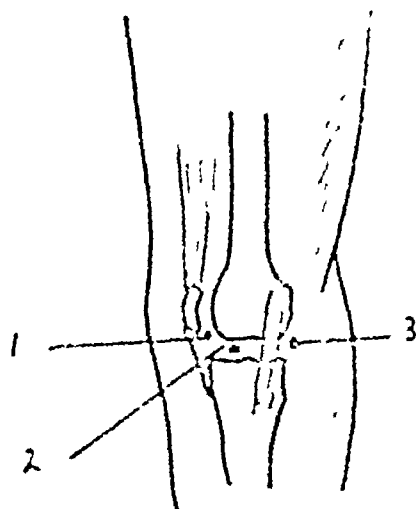


FIG. 1. Recurrent attacks of pain referred to either side of or behind the patellar ligament.

severe and are unassociated with locking. They are particularly liable to occur on extension of the joint, e.g. going upstairs. The attack may be followed by a transitory effusion and the vicious circle already referred to has commenced to revolve. In established cases operation may be necessary in order to remove the thickened synovial fringe.

(2) *Ligaments*. Either the lateral or cruciate ligaments may be damaged by injury. Although the lateral ligaments are not intra-articular structures, yet it is customary to include them under the term 'intra-articular ligaments'.

The external lateral ligament is rarely injured except in association with extensive injury of the joint to the extent that the internal ligaments are

constantly in a state of strain owing to the normal condition of slight *genu valgum*. Nature compensates for this by attaching the ligament to the diaphysis of the tibia rather than to the epiphysis. Partial or complete rupture of the internal lateral ligament is followed by severe local pain and tenderness over the site of the injury, and if the synovial membrane is also torn a hæmorrhagic effusion occurs into the joint. Treatment consists of adequate rest and support until swelling has entirely disappeared, and if extensive laceration has occurred suture should be considered. When walking is resumed the sole of the boot corresponding to the side of the injury should be raised one third of an inch in order to relieve strain on the damaged ligament.

The crucial ligaments are torn only as a result of gross injury. The anterior may be ruptured by violent hyper-extension, but the posterior ligament alone is unlikely to be torn as flexion is limited by approximation of the calf and thigh. Both ligaments may be torn in association with lateral dislocations. Undue mobility and subluxation of the joint indicate the nature of the injury, thus if the anterior ligament is torn the tibia can be subluxated forwards on the femur. Attempt to suture a torn crucial ligament is unlikely to be successful as the injury is, in reality, avulsion of a flake of bone at the tibial attachment of the ligament. Reconstruction of ligaments has been practised, by drilling the bones obliquely and drawing through the resultant tunnel a strip of ilio-tibial band as a substitute for the anterior ligament, and the tendon of the semi-tendinosus for the posterior ligament. Owing to the tendency of these structures eventually to stretch, the ultimate results are disappointing. The most satisfactory treatment for rupture of crucial ligaments consists of a fortnight's rest in bed, in order to allow effusion to absorb. Aspiration of the joint is useful in order to expedite the removal

of effusion and to relieve discomfort. A plaster of Paris casing is then applied for a minimum of six weeks, after which time it is hoped that the torn ligaments have healed, or more correctly, the flake of bone united. massage and passive movements are instituted and the patient gradually attempts to regain active movement. Should instability persist then a knee support should be worn, a satisfactory type being that devised by Howard Marsh.

(3) *Cartilage*—Fragments of articular cartilage may be chipped off the underlying bone. This is particularly likely to occur when a smart blow on the patella drives it against the edge of a condyle.

Much more commonly one of the semilunar cartilages becomes torn or loosened. The internal cartilage is affected twenty times as commonly as the external, as it is fixed by its attachment to the internal lateral ligament. It is beyond the scope of this article to discuss all the possible mechanisms which may lead to tearing of a cartilage, but one of the commonest is as follows.

During outward rotation of the femur on the tibia the associated movement of the more mobile external cartilage is transmitted by the transverse ligament to the anterior horn of the internal cartilage. This

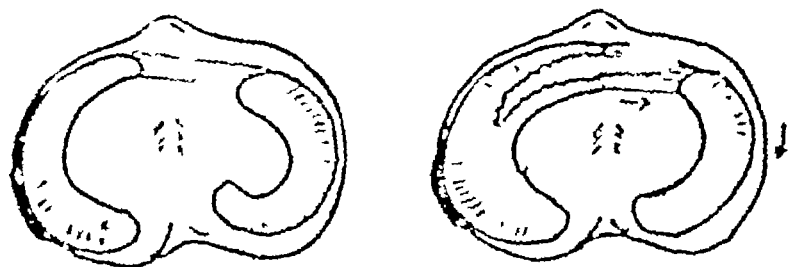


FIG. 2. The position of the femur on the tibia, showing the position of the external cartilage, and the position of the internal cartilage, and the position of the transverse ligament.

could exert a strain on the fixed internal cartilage, rip it from below (see Keyes (11, 2)).

Relaxation of a joint, which occurs after effusion or loss of synovial fluid, is followed by slight abnormal

separation of the femur and tibia. Hence there is an increased liability for the cartilages to be caught between the articular surfaces of the bones, with consequent loosening or actual tearing of these structures. During the war in Mesopotamia epidemics of cartilage affections occurred at the end of the hot weather, owing to sudden resumption of normal activities.

The clinical features of injury to a semilunar cartilage consist of sudden sickening pain and inability to extend the joint. A rapid effusion follows, and localized tenderness is present over the intra-articular groove on the inner side of the knee (Fig. 1). A history of a previous similar attack may be obtained or volunteered by the patient.

Efficient treatment of the condition is of the utmost importance if subsequent convalescence is to be shortened and disability prevented. Complete reduction of the cartilage is essential, and should be performed without delay. This may be accomplished, preferably as a first-aid measure, by flexing the knee and hip, and placing the leg in a position of eversion and abduction. Sudden inversion and extension of the leg, e.g. by instructing the patient to suddenly "kick the leg straight" usually results in reduction. If this manœuvre fails, an anæsthetic must be given, preferably a general, in order to ensure muscular relaxation, and deliberate manipulation is applied in order to ensure satisfactory reduction, which is shown by the fact that the leg can be fully extended. A cooling lotion and a firm bandage are applied in order to discourage further effusion, and a back splint prevents flexion of the joint. Massage of the quadriceps is commenced about the third day after the injury, as these muscles waste rapidly. After three weeks it is hoped that the torn cartilage has united, but, in cases which do not recur, it is more likely that the torn portion has become adherent in such a position that subsequent movements do not again bring it between the articular surfaces. Moreover, the avascular

structure of cartilage and the rapidity with which the raw surface is covered by endothelium mitigate against union. Gradual flexion is then permitted, and subsequent events awaited. In between 60 per cent and 70 per cent. of cases, recurrence follows, in which case operation is advised, as a repetition of conservative measures is unlikely to be successful, and repeated locking will lead to osteoarthritic changes. Moreover, the possession of a loose or torn cartilage is a potential danger, and in one case under the writer's notice a tragedy nearly occurred owing to a cartilage slipping in a busy thoroughfare.

Investigation of a series of cases indicated that operation in 84 per cent gave perfect results, i.e. a painless joint with a complete range of movement, provided that the patient was under 35 years of age and had not had more than three attacks.

(4) *Bone*.—Small portions of bone are sometimes separated by injury, or avulsion of a tibial spine may be associated with a torn crucial ligament. If the bone is completely separated, it forms one variety of loose body. In examining an X-ray of a joint after injury the possible presence of a sesamoid bone in the outer head of the gastrocnemius must be remembered. The shadow of a sesamoid bone lies above the intra-articular groove, and the long axis is in the vertical plane.

(5) *Loose bodies*.—These may be derived from fibrin in the case of hemorrhagic effusions, or synovial fringes, which have become ossified or chondrified, may separate. Attached portions of bone or cartilage have already been mentioned. Occasionally a loose body appears for no apparent reason, and one recently described was found to be a fibroma, irregular in shape and 2½ inches in its largest dimension.

The symptoms of a loose body resemble those of a torn cartilage, but are usually less severe, and pain is referred to the popliteal fossa (Fig. 11). Attached portions of bone or cartilage, although often more frequent, and the associated effusion is less marked. The

patient often learns the trick of so manipulating his knee that he can bring the loose body into a palpable position. Unless degenerative changes are so extensive that operation is useless, removal should be attempted. If the body can be manipulated into the subcrural pouch, it should be trapped in that position by a bandage around the lower part of the joint, and removed by a vertical incision. Failing this, exploration of the joint may be necessary, and if the loose body cannot be retrieved, it can sometimes be dislodged from the postcondylar pouch by means of a stream of sterile saline forcibly injected into the joint by means of a Higginson's syringe.

Operative details are beyond the scope of this article, but it may be stated that, if the diagnosis of injury to the internal semilunar cartilage is reasonably certain, then an incision, either curved or transverse, on the inner side of the joint, is adequate. The incision may be carried halfway around the joint without risk of injury to the internal lateral ligament, which is situated postero-internally. If free exposure of the joint is desired, a vertical incision splitting the quadriceps tendon skirting the inner side of the patella (which is dislocated outwards) and the patellar ligament gives good exposure. Sawing through the patella in a vertical direction with subsequent suture of the aponeurosis appears to predispose to subsequent osteoarthritis, and should be abandoned in favour of the previous method of exploration.

A recent method of exposure of the joint, based on that obtained in cases of fracture of the patella, consists of dividing the patella by means of a longitudinal (coronal) saw-cut. The anterior half of the patella remains attached to the patellar ligament and is turned downwards, while the posterior portion of the bone is turned upwards and remains attached to the quadriceps tendon. The writer has adopted this procedure in one case, and the exposure obtained was excellent.



# The Medical Properties of Wines

By G. MURRAY LEVICK, M.R.C.S., L.R.C.P.

IN discussing the physiological action of wine, it must be remembered that it is a mixture of compounds, and that the effect of drinking wine is not simply that of drinking diluted ethylic alcohol. Edward Mellanby says that "we may, without any serious inaccuracy, use the simple word 'alcohol' when we are speaking of the action of ethylic alcohol, whether it is taken as the chemically pure substance diluted with water, or in the more complex fluids such as beer, wine or brandy," but he refers simply to the ethylic alcohol factor. Moreover, it must be borne in mind that the effect of alcohol on the various classes of people who drink it should be estimated by the results not of alcohol from the laboratory shelf, but the effect of certain quantities of wine or beer or whisky as the case may be. That is the aspect of the question to be considered in advising patients. Those experienced in drinking moderate quantities of wine know that the reaction to it varies considerably according to the type and condition of the wine drunk. Nor should too much reliance be placed upon the results of certain experiments based upon the injection of ethylic alcohol from the laboratory into the stomachs of dogs, the animals which have been used in many of the physiological experiments on alcohol. In the first place these results have almost eliminated the important psychical effect of alcohol, which is closely related to the physiological effect and in many instances predominates. Ethylic alcohol taken even in sufficient quantity to do some physiological harm, may by its effect on the action of the patient counterbalance its own toxicity.

the physiological harm in the long run. Such a case might be that of an over-worked business man whose mind is harassed by financial worry, or perhaps the type of man whose reactions seem to become monotonous from leading too blameless and sheltered a life. Some, indeed, might agree that an occasional over-indulgence of alcohol, if it is not habitual, may provide a wholesome shock to such a person. There is, moreover, a happy mean in which wine may be taken in a quantity that cannot be shown to harm a man physiologically, while it confers upon him the benefits of a well-digested dinner, a cheerful evening of relief from worries and a sound night's sleep.

In discussing the effect of wine, I shall first deal with the alcohol before comparing the other constituents which impart their widely differing characteristics to the various vintages. The alcohol investigation committee of the Medical Research Council<sup>1</sup> obtained results from their experiments with pure ethylic alcohol diluted with pure water, from which the following may be quoted.—One-fifth is absorbed in the stomach, one-tenth in the upper small intestine, one-half in the middle small intestine, and one-fifth in the third part of the small intestine. Its absorption into the blood is therefore complete and more rapid than, for example, meat or starchy food. The level of maximum concentration, which may be taken as meaning the maximum stimulating stage, is reached in from half to two hours. The speed of absorption varies in different wines, the strength of dilution and time in relation to meals. The fatty elements of milk delay absorption to a well-marked extent when alcohol is taken within  $2\frac{1}{2}$  hours of the milk. Meat delays absorption only very slightly. Absorption of alcohol from wine is slower than the same dose of spirit equally diluted with water. Absorption is quickened when a glass of water has been drunk an hour or so previously. The rate of

absorption in different wines has not been worked out, but my own experience goes to show that absorption is more rapid from white wines than from red wines of equal strength. With regard to dilution, Mellanby found that when a given dose of alcohol is given at 20 per cent strength the alcohol is more rapidly absorbed and reaches a higher level of concentration in the blood than when the same quantity is taken in 5 per cent. solution. This is, of course, a matter of common experience, but should be remembered in prescribing alcohol for various conditions.

The ultimate feeling of calm well-being is better obtained with natural wines taken gradually during dinner than by strong drinks taken before it, partly owing to the gastric irritation of strong alcohol on the empty organ. This also is not conducive to sound sleep, especially in the early hours of the morning when the last of the meal passes out of the irritated stomach.

It has been said <sup>2, 3</sup> that alcohol diminishes neuro-muscular co-ordination, but this statement must be accepted with some reservation in view of the summing up of their experiments by the Medical Research Council and other evidence quoted below. I may give also here an instance to prove what has been said about the way in which the psychological effect of alcohol may do good. Of all games in which neuro-muscular co-ordination is essential, golf must come about, if not quite, at the top of the list. The open championship competition imposes a particularly severe nervous strain, and those very exceptional players who have reached the last two or three rounds feel this strain acutely, realizing that, among such perfect golfers, a small fault in the playing of a single shot in the next day of all games may cost them the match and the championship itself. I was told by a man who had been at the open championship competition this year that with one exception all the players in the last two rounds in the morning took a lot of alcohol

before going on to the tee. In the changing-room before they went out, they all seemed to be acutely nervous, and these experienced men knew that a little alcohol would improve their play.

Alcohol appears in the milk of inebriate women, but only when very large quantities are taken, and even then it appears in too small an amount to affect an infant<sup>4</sup>. In pregnant women, however, absorbed alcohol must, of course, affect the foetus equally with its mother, and in ordinary circumstances appears to be undesirable. During and after middle age, especially in those leading sedentary lives, the vasomotor stimulation of alcohol may tend to favour the dispersal of those toxic deposits which tend in some people to take place in the fascia and fibrous tissue of various parts of the body. There is not any evidence that alcohol in moderation causes gout in people who feed judiciously; its effect as a gouty factor usually only becomes manifest when, especially in some form of sweet liquor, it is superimposed upon an over-abundant diet (*vide* p. 199).

Some, but probably very little, alcohol may be lost to the body in the breath and in the urine; there is none in the sweat. At least nine-tenths of the total dose has to be burnt up in the body. A man of ten stone disposes of 7·1 c cm. of alcohol in an hour, or two-thirds of a pint of proof spirit in 24 hours. The combustion begins as soon as it enters the blood, but proceeds slowly so that very little has been burnt up before the whole is absorbed into the blood, and the maximum concentration bears a fairly regular relation to the original dose.<sup>5</sup> The result of the combustion is carbon dioxide and water which leave by the breath and urine. It means that the alcohol cannot leave the body until it has been burnt up in the tissues. The worst dangers of chronic alcoholism lie in the drinking of more alcohol before the tissues have completely got rid of the last dose. The "hair of the dog that bit

you" is a very inadvisable remedy for over-indulgence the night before. The liberated energy of alcohol is used by the body in the same way as the energy from ordinary food, but the whole food value of alcohol is its use by the body as a fuel, and it cannot be stored up and held in reserve as in the case of carbohydrates and fats.

This article is concerned with the effects of wine taken in moderation, the effects of excessive drinking have nothing to do with the subject and should not be allowed to influence our minds in deciding for or against the desirability of alcohol for the average man. Those who drink and enjoy wine in moderation know that it induces happiness and contentment. Temporarily it loosens the tongue a little, promotes friendliness and improves the digestion. Personally I feel fresher and better on waking in the morning when I have drunk at least a pint of claret at dinner than when I have drunk only water, and I notice the same result after quite considerably exceeding that quantity.

There are certain other effects of moderately large doses of alcohol it is well to bear in mind. Temporarily we experience a certain diminution of caution both in speech and action. Temporarily ability to undergo extreme exertion, perform balancing feats, make mathematical calculations and perform difficult feats of memory may be slightly impaired. These transitory effects do not matter in the least when wine is taken at a suitable time and are therefore no argument against its being taken at such a time, and in spite of the pleasurable stimulation of the brain, our mind may obtain a much needed rest from a host of those petty vexations that wear it out a time far more than the business difficulties of life, by modifying our attitude towards them.

In a very recent many the people of valuable help to the human mind, common I have seen to be of use, I have seen the effect. The main reason

in France was a very humane thing To a lesser degree these benefits may be conferred upon suffering people in peace time and I often think that there are many cases in which we might brighten the lives of certain patients by the judicious prescription of wine, and neglect to do so through not realizing the benefits it can bring when properly used

In view of the mass of anti-alcoholic literature which has been appearing of late, it is important to speak quite plainly in criticism of certain exaggerated statements. For example, we read in the volume on alcohol of the Medical Research Council,<sup>5</sup> that "without signs of intoxication in the full ordinary or legal sense of the term, the bearing and general attitude of mind suffer temporary change likely to be fraught with serious consequences; the tactful handling of colleagues and observance of discipline are among these, and an additional source of friction is brought to complicate the relations between employer and employed."

Seeing that these results are stated to ensue from the drinking of a little alcohol, insufficient to produce any signs of drunkenness either in the ordinary or legal sense, I have no hesitation in saying that the statement is not only an exaggeration but actually the reverse of common experience Paradoxically, however, they contradict this statement in their summing up of their results There is another argument against attaching too much importance to the results of the laboratory experiments on the effect of small doses of alcohol. The temporary and slight impairment of mental function only noticeable after the most exacting tests, and the equally slight loss of physical control and endurance would probably be at least as great immediately after a hearty wholesome meal, and after other things incidental to a normal life. Again we read in the same publication. "Within half an hour of taking 40 c cm of alcohol there came on "in this person (a volunteer), a subjective feeling of lassitude and dis-

inclination for activity either of body or mind " This cannot be taken as an example of the effect of moderate drinking of wine or beer. To drink at a draught 40 c.cm. of pure ethylic alcohol from a laboratory bottle would be a silly act which no sensible person would perform in ordinary circumstances. In summing up the results of their experiments, however, two clear statements are made. A single dose of 2½ oz. of *proof* whiskey exerts little or no influence on the performance of simple muscular acts. It is also stated that there is evidence that the rapidity with which a simple act of memory is recalled may be increased by alcohol in moderate doses.

Experiments have shown that alcohol in moderate doses has no effect of practical importance upon the respiration. The only important effect here is the paralysis of the respiratory centre by very large doses such as to cause death by alcohol poisoning.

Whereas high concentration of alcohol may lower resistance to disease, small quantities may have the reverse effect. Parkinson<sup>6</sup> reports that drinking some 12 per cent. solution actually improved the formation of antibodies in the blood. This is confirmed by Friedberger.<sup>7</sup>

On the other hand it has been shown by Stillman<sup>8</sup> that pneumococci sprayed on mice infected the lungs more readily when the animals were intoxicated, but the infection was excessive as also the intoxication. The fact is that alcohol can produce opposite results according to whether the dose is large or small, and this must be borne in mind when considering the evidence that alcohol may reduce resistance. When a person is in the early stages of a severe cold, considerably more alcohol is required to produce the effect of even slight intoxication than at ordinary times. When we consider this interesting observation with the common knowledge that a mild "bunch" quite commonly tips this complaint in the bad it

seems possible that the alcohol neutralizes the catarrhal toxin and vice versa

With regard to tuberculosis the evidence is interesting. Homen<sup>9</sup> carried out work which suggested that alcohol increased the phagocytic power of the cells most concerned in resisting the tubercle bacillus. Mircoli<sup>10</sup> found the blood serum to be more antitoxic in tuberculous patients given alcohol than those without it, and animals so treated were more difficult to infect with tuberculosis than those without alcohol. Many statistics have shown that tuberculosis is less frequent among drinkers than among abstainers. For further evidence on this point reference may be made to a review on alcohol published in 1931.<sup>11</sup>

In hot climates alcohol should be taken with extreme caution; but the opinion of the majority with tropical experience is that those who take a moderate amount at sundown are in better health than those who abstain altogether, although the effects of excess are possibly increased in hot climates.

As regards the effects of moderate drinking, everything goes to show that wine, beer and cider are more advisable for habitual drinking than concentrated spirits. The wine drinker is less likely to take injurious doses of alcohol for two reasons; in the first place most wines contain alcohol in a suitable dilution; further the whisky or gin drinker gets into the habit of drinking solely for the stimulating effect of the alcohol. The wine drinker on the other hand can scarcely fail to develop a critical palate which raises the love of good wine almost, if not quite, to the level of an intellectual pleasure. The more this taste is developed the more likely is the consumption of wine to be sensible and moderate. I know a good many true connoisseurs of wine and among them excessive drinking is exceptional. Everyone will probably agree that the best time for taking alcohol regularly is the evening. The negative phase following the period of stimulation and the maximum narcotic effect will



then be reached during sleep, and generally have passed quite away by the morning.

On the effect of alcohol in moderate doses the summing up of the Medical Research Council's publication may appropriately be quoted: "We deal here solely with the physiological aspect of the alcohol question, and our consideration of this aspect leads us to recognize that the agreeable effects which the majority of people experience from the use of alcoholic beverages can be produced by doses of alcohol, moderate in quantity and taken in adequate dilution and at sufficient intervals, which will not, in normally constituted persons, be attended with appreciable risk to physical or mental health." This statement, which is made at the conclusion of a course of research work by accredited physiologists, appears to sum up very much in accordance with our common experience.

There is nothing in any of the various wines that is intrinsically bad for the average individual. At the same time, wine is an article of diet that is liable to affect the idiosyncrasies of different people. L. J. Llewellyn,<sup>12</sup> says that the palate and the stomach are the best criteria of the wholesomeness of a wine for each individual. He is dead against the habit of light heartedly taking a gouty man off wine and putting him on whisky instead, and points out—as others have pointed out—that a good mature wine is, subject to idiosyncrasy, just as good for a gouty man as whisky. I would go further and say it is much safer for a man with a knowledge of wine who can detect a fault by its flavour much more easily than anyone can detect it in whisky. For a patient without such knowledge, it is of great assistance if his doctor knows enough of the subject to advise him what to buy. Sir Isaac Goodhart said: "I am as much as ever an opponent of the prevailing dictum 'you must not touch wine, you must drink whisky'." In discussing the treatment of uric acid he says, "It is one of the great mistakes and no wonder!"

that ever plagued a world ”

It is important for the practitioner to remember that it is the quality of the wine as much as its name which really matters. For example, an immature or unsound claret has just those faults of which a good claret is entirely free. It is usually held that a dry wine is better for gouty people than a sweet one, but possibly this statement need not be made of all individuals. The alcohol and the sugar of wine occupy much the same position in the dietary of a gouty person as the nuts with which port used so often to be drunk. Nuts, which are especially rich in protein, may cause a disturbance of metabolism when eaten at the end of a heavy meal. Wine, and especially sweet wine, may upset a gouty person when drunk with a meal rich in carbohydrate or after too big a meal. In this case the meal itself is just as much to blame as the wine. For this reason port took too much of the blame for the gout of our forefathers; it was simply “ the last straw ” and nothing else.

The consideration of the prescription of the various wines is a much simpler matter than was formerly supposed. From the dietetic standpoint we may regard them as follows :—

*Claret* —Water with from 6 to 11 per cent of alcohol, tartaric acid, 5 per cent, tannic acid, about 0.08 per cent, no sugar

*Burgundy* —Water, with 9 to 13 per cent of alcohol, tartaric acid about 5 per cent, tannic acid, about 0.05 per cent, either no sugar or just a trace

*Sauterne* —Alcohol, 9 to 13 per cent, acid, 5 to 7 per cent, sugar, from 0 to 7 grains per ounce

*Hock* —Alcohol, 9.5 to 13 per cent, acid, 5.3 to 6 per cent, no sugar

*Moselle* —Alcohol, 8.7 to 9.4 per cent, acid, 4.8 to 7.6 per cent, no sugar

*Champagne* —Alcohol, about 12 to 14 per cent, acid, 4 to 5.2 per cent, sugar, from 6 to 24 grains per ounce

*Port* —Alcohol, 20 to 23.2 per cent, sugar, 16 to 34 grains per ounce, acid, 3.6 to 5 grains per ounce

*Sherry* —Alcohol, 15.4 to 24.7 per cent, sugar, 0 to 18 grains per ounce, acid, 3.3 to 4.8 grains per ounce

The above analysis is all that need be considered

dietetically. A good deal of misconception exists about iron in wine; claret and burgundy are often prescribed on the fallacy that they are rich in ferruginous matter. As a matter of fact, there is a very minute trace in these wines which may play just a small part in adding to their colour, but that is all. For example, Mulder found that burgundy may owe a very little of its colour to tannate or oxide of iron, but the quantity is too small to be considered physiologically. The flavour and aroma of the various wines which were very carefully analysed by Prof. Mulder of Utrecht are due to the presence of substances so minute in quantity that a large bulk of wine is needed to obtain sufficient for analyses. The characteristic vinous smell and flavour are due to cemanthine ether. This ether exists in all wines as an infinitesimal trace. It is a product of the fermentation of the sugar. In course of time, as the wine matures, acetic, butyric, caproic, caprylic, and some other ethers are formed, all in dietetically inconsiderable quantities. In the older wines quite a large number of other ethers appear, but various odoriferous substances impart their characteristics to wines of different localities because they vary in the locality where the grapes are grown.

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# Practical Notes

## *Etiological Factors in the Development of Exophthalmic Goitre*

W A Plummer and Charles Mayo, 2nd, have come to the conclusion that in cases of exophthalmic goitre or hyperthyroidism from adenomatous goitre, in which the onset of symptoms was attributed to acute infection, nervous shock or operation, a critical review of the histories will usually indicate that the disease was present before the acute infection, nervous shock or operation. In the isolated cases in which the time of onset of the toxic symptoms of goitre coincides approximately with some major operation, not of the thyroid gland, the relationship may be coincidental. Even in cases of exophthalmic goitre, a disease which many observers believe is based on constitutional predisposition, major operations and their associated factors, such as acute and chronic infectious processes, fear and trauma, do not usually precipitate the disease. In spite of the infrequency of cases in which the development of exophthalmic goitre and of hyperthyroidism from adenomatous goitre approximately coincides with that of some major operation not related to the thyroid gland, and admitting the possibility of coincidental relationship, the authors believe that the evidence obtained in the cases so far studied tends to support the contention, frequently held, that acute or chronic infectious processes are precipitating or aggravating factors in the development of exophthalmic goitre or of hyperthyroidism from adenomatous goitre if persons are predisposed to these diseases. That infectious processes, in the etiology of exophthalmic goitre, affect the thyroid gland specifically or directly has never been proved. It is probably the consensus of opinion that they play an etiological rôle only in certain cases, and then by lowering the resistance of the patient, by exerting some unusual stimulation on the thyroid gland, or in some other indirect, non-specific manner—(*Surgery, Gynecology and Obstetrics*, December, 1931, *iii*, 721 )

## *The Treatment of Hyperthyroidism by Radiotherapy*

J Maisin, F van Goidenhoven and others publish an important contribution from Louvain on the treatment of hyperthyroidism by X-rays and radium, 30 cases were treated by X-rays, of which 20 were typical exophthalmic goitre, 6 toxic adenoma, and 4 atypical hyperthyroid cases, 91 cases were treated by radium, 64 of them typical exophthalmic goitre, 16 toxic adenoma, and 11 atypical forms. The authors have come to the conclusion that radium has many advantages over X-rays in the treatment of hyperthyroidism, and out of the 30 cases treated by X-rays, the 9 which did not benefit by this treatment improved very much on subsequent treatment by radium. The authors state that in their opinion the results of treatment by radium are as good as by thyroidectomy. Treatment with iodine can be employed in association with treatment by radium, but the patient must be watched very closely. —(*Revue Belge des Sciences médicales*, 1931, *iii*, 785 )

### *The Treatment of Achlorhydric Dyspepsia*

J. Moore Andrew states that there are many cases of dyspepsia often overlooked, in which the test meal reveals diminution or absence of free hydrochloric acid in the gastric juice. The therapeutic test of administration of acid is of value in those cases which do not give an early and maintained response to alkali treatment when organic and reflex causes for the dyspepsia have been excluded. Confirmatory test meal, at least by the qualitative method, is useful as a guide to treatment. It is important to recognize the relation of achlorhydria to the pre-anemic state and the early spinal cord changes of Addisonian anemia. Treatment, to be effective, must be directed first against the cause, when this is possible. It is necessary to insure that the teeth are in good order and sufficient in number, so that the food can be masticated properly. Septic teeth, tonsils and antra should be eradicated, if present. Worms, anxiety and overwork, should be removed as far as this is possible, especially if nervous symptoms be present and if the blood pressure be low, rest should be enforced. There is no need for the restricted dietaries that are necessary in the treatment of ulcerative conditions of the stomach. Certain principles guide one in advising the patient as to diet. First, the food should be taken as dry as possible to minimize dilution and consequent diminished concentration of acid available for gastric digestion. Secondly, the taking of excessive protein is unwise, except in so far as its aroma stimulates appetite, for it needs more acid for the initial stages of its digestion than does carbohydrate. Thirdly, fatty flesh and those cooked in fat should be avoided, as fat, by absorbing free acid, inhibits digestion. Hydrochloric acid is the specific drug in the treatment of these patients. For guidance in the administration of acid Beckman recommends, among others, the following principle: (i) Give the acid in as large amounts as possible compatible with the tolerance of the patient, up to 10 mils (2.5 fluid drachms) per day. (ii) Use the acid in fractional doses commencing during the meal and continuing through digestion for at least half an hour. (iii) A meal of carbohydrate only, given with the full dose of acid, is valuable in that it induces a condition of free gastric acidity. Brochies considered with various gastro-physic drugs have been used in those cases where the nervous symptoms predominate, while liquor atropinæ sulphatis is given before food in cases showing marked pyloric spasm. Where a definite anemic condition is present, iron may be added to the mixture containing the acid. Dr. Andrew has given 5 grains per day of the pure hydrochloric acid of hydrochloric acid added to the food. (*Medical Journal of London*, November 21, 1931, p. 644.)

### *The Treatment of Gastric and Duodenal Ulcers*

J. W. Hunt has reported the results of treatment of 524 cases of gastric and duodenal ulcers in the past five years. He has found that the most effective treatment is the use of the following: (1) A diet of soft, easily digestible food, such as milk, cream, butter, and eggs, with a small amount of meat. (2) A course of antacids, such as sodium bicarbonate, to neutralize the acid. (3) A course of sedatives, such as morphine, to relieve the pain. (4) A course of antibiotics, such as penicillin, to prevent infection. (5) A course of surgery, if necessary, to remove the ulcer. He has found that the most common cause of ulcers is the use of aspirin and other drugs that irritate the stomach lining. He has also found that the most common complication of ulcers is the development of a cancerous growth. He has found that the most effective treatment for ulcers is the use of the following: (1) A diet of soft, easily digestible food, such as milk, cream, butter, and eggs, with a small amount of meat. (2) A course of antacids, such as sodium bicarbonate, to neutralize the acid. (3) A course of sedatives, such as morphine, to relieve the pain. (4) A course of antibiotics, such as penicillin, to prevent infection. (5) A course of surgery, if necessary, to remove the ulcer.

satisfactory results, and if one will refrain from operating upon these patients early in the course of the disease and refer them only after every attempt at medical treatment has failed, the surgical results will be most gratifying with conservative types of operation, either gastro-enterostomy or, in selected cases, of pyloroplasties. Any attempt to call a patient cured after either medical or surgical treatment unless followed for a ten-year period, and frequently examined, is most misleading — (*Annals of Surgery*, December, 1931, xiv, 1011)

### *The Treatment of Hemophilia by Protein Sensitization*

R. Cannon Eley and S. H. Clifford have treated eight children suffering from hemophilia by protein sensitization (intradermal injections of horse serum) for a period ranging from a few months to more than two years. In each case there was a definite reduction in the coagulation time of the capillary blood. However, it should be emphasized that the coagulation time of the venous blood was not altered. The treatment proved of no value in controlling hemorrhage from the larger blood vessels or in preventing the occurrence of hemorrhagic effusion into joints, subcutaneous hematomas or intestinal bleeding. The therapy was, however, of convincing benefit in the prevention or control of bleeding from superficial injuries. Despite its limited benefits, this method of treatment is of sufficient value to be advised in every case of hemophilia — (*American Journal of Diseases of Children*, December, 1931, xli, 1331)

### *The Causation of Colds*

H. Schade suggests that the determinative factor in the causation of "chills" and "colds" is not the degree of cold shown by the thermometer, but the extent of chilling resulting from the joint effect of all the weather conditions prevailing. The relation between chills and colds (including muscular rheumatism) and the chilling capacity of the weather is proved from large-scale statistics by the regular parallel movements of the curves of these disorders with that of frost-bite. In the action of cold in the causation of disease, three kinds of processes must be distinguished: (a) Alterations in tissue colloids of the nature of gelosis at the point of attack by the external cold, (b) action of cold at a distance, distributed throughout the whole of the human body, principally in the form of stimulation of the sympathetic nervous system, (c) lowering of resistance to infection, found in human beings and other forms of life. A characteristic feature of the "period of colds and chills" in the statistical tables is the variety of disorders met with. The harmful effects of cold on the tissues are characterized by an incubation period, a time-law of latency, cumulative action and selective action in the deeper tissues, of a very similar nature to those known to be caused by visible and invisible rays. Even a slight amount of chilling can produce disorders of the human body, if the conditions favourable to "insidious entry" are present in the tissues. The problems of the action of heat and cold on the human body are in many respects physico-chemical, and demand for their solution molecular pathological research — (*Archives of Medical Hygiene*, January, 1932, x, 11)

## Reviews of Books

*Thompson and Miles' Manual of Surgery.* By ALEXANDER MILES, M.D., LL.D., F.R.C.S.L., and D. P. D. WILKIE, M.D., F.R.C.S. 8th Edition. Oxford University Press. London: Humphrey Milford. 3 Vols. Pp. 1,837. Figs. 656. Price 12s. 6d. each volume.

This well known textbook, the former two-volume Thomson and Miles re-written in three volumes, has preserved its old appearance and make up. The volumes are octavo, the printing close, and the text interspersed with many illustrations, for the most part photographs. The authors have been assisted by many collaborators, all present or past Edinburgh teachers, so that the reader can get a fairly complete picture of the conceptions regarding surgical matters in that school. These may be epitomised as soundness with a tendency to conservatism, as indeed may probably be said of the teaching of any great medical centre in this country. A surgeon reading any large surgical textbook will find on most pages matter for comment and we are surprised that in the chapter on general anaesthesia the only reference to sympathetic surgery is one line on paravertebral sympathectomy, though we agree that in amputation the tourniquet should be avoided. Under "actinomycosis" there is no mention of the appendix, though under "appendix" this disease receives a reference, but we are surprised that actinomycosis of the appendicular region is considered rare and that no mention is made of the good results that are usually obtained with the combination of drainage, operation and saline medication. Under acute cholecystitis we should like to see some discussion of the indications for early or late incision, the treatment advocated being merely that of letting out the pus. In the section on bones, there is no reference to the relation of parathyroid tumours to generalized osteoporosis, but we do not quarrel with the authors for omitting all mention of the need for ultra-violet rays in those in whom osteomalacia exists. Brodie's abscess is to be drained whenever it is our experience that in the majority of cases after opening the abscess healing by primary union may be anticipated. The section on head injuries has been carefully written, but we cannot agree with the appointment of these valuable papers to the revision of extended lectures which is a proportionately small field of the far commoner and much more important diseases admitted for teaching. In dealing with the various forms of cerebral abscesses, the views are somewhat antiquated, but they are not entirely new—Hutchinson's method of treating tubercular abscesses is still followed by several teachers of medicine, and the whole discussion of fibrous exudates is very quaint and somewhat heterogeneous at the present time. The author's explanation of the cause of abscess formation in the meninges after injury is hardly satisfactory. There is a fair amount of information about the various types of softening of the brain, but the account of the pathology of the various types is somewhat superficial. We sympathise with the authors in their desire to keep the book simple and uncluttered, but regret that the result is a somewhat dry and uninteresting volume.

as that of removal of the appendix as soon as the diagnosis has been made, with none of the reservations now popular in some quarters, as to withholding operation after forty-eight hours. We did not find a misprint and we are of opinion that this famous work has been worthily rejuvenated and will continue to hold its place among the pre-eminent surgical textbooks.

*The Management of Abdominal Operations.* By ROBERT H. MAINGOT, F.R.C.S. London: H. K. Lewis & Co., Ltd., 1931. Pp. 301. Price 7s. 6d.

This is a convenient volume at a reasonable price, fulfilling the needs of many practitioners as a readily accessible reference in the treatment of surgical abdominal disease. Mr. Maingot's scheme gives much associated detail in addition to the actual "management" of cases, but the inclusion of various alternative methods gives an impression of over-treatment. This over-stressing of many valuable forms of treatment cannot be commended as a guide for the practitioner. For example, we cannot approve of the generalized recommendation of repeated doses of morphine, the administration of blood transfusions to the extent advised in hæmatemesis, and the amount of interference in some conditions associated with extreme degrees of shock. The adoption of Fowler's position prior to operation in patients with perforations of ulcers is not countenanced by the patient's condition as usually presented. Further details regarding the after-care of colostomies would not be amiss, in view of the lack of instructions available in the general surgical literature. The space devoted to the post-operative care of "chronic appendicitis" seems to be unnecessary, as these cases usually progress with uninterrupted recovery. Some chapters cover their subjects excellently, particularly that in relation to blood transfusion, in which the great importance of careful and complete investigation of compatibility is observed, and that on the treatment of gastric and duodenal ulceration, when the dietary is an essential subsequent to any surgical measures. Many useful points appear throughout the book, especially in respect of such minor complications as are wont to occur without obvious cause, but which exhaust the patient from their persistence without relief by ordinary measures.

*Diseases of the Stomach.* By HUGH MORTON, M.D. London: Edward Arnold & Co., 1931. Pp. vii and 184. Illustrations 8. Price 10s. 6d.

In the first ten chapters the various diseases of the stomach are systematically and concisely described with inclusion of the modern methods of diagnosis and treatment, and in a final chapter the test meals and other diagnostic tests are tabulated. In the account of gastric neuroses, which follows that of gastritis, the pain of hyperchlorhydria is described and attention drawn to its spread to the precordial region, thus suggesting angina pectoris. The chapter on peptic ulcer naturally includes duodenal ulcer, which is accompanied by a good radiogram, another, and striking, one of an hour-glass stomach appearing in the subsequent section on deformities. In the treatment of ulcer, tobacco and alcohol are strictly prohibited, and the author wisely adds that it is quite unnecessary to restrict business letters, as often the worry thus caused would be more





*An Index of Prognosis and End-Results of Treatment* By Various Writers, edited by A RENDLE SHORT, M.D., F.R.C.S. Fourth Edition, fully revised Bristol John Wright and Sons, 1932 Pp xi and 599 Price 42s

Prognosis is the most difficult part of medical practice and the success of this popular source of reference proves that it meets a real demand. Since the last edition many changes have become necessary, the important account of mental diseases, originally contributed by the late Sir Thomas Clouston, has been entirely rewritten in accordance with the new classification by Dr H Devine and occupies twenty five pages. The articles on diabetes mellitus, pernicious anemia, and nephritis have also been rewritten. Most of the surgical and gynecological articles have been greatly altered, and, as the editor points out, the revision has been so complete that about half the volume is new. There are thirteen new contributors, and among them Dr G Bruce Perry shares with his senior colleague, Dr Carey Coombs, the responsibility for most of the articles on the circulatory system. The editor, who has taken a large share of the burden of the articles on general surgery, must be warmly congratulated on the results of his labours.

*St Bartholomew's Hospital Reports* Vol LXIV London John Murray, 1931 Pp xxv and 231 Plates 10 Figs 25 Price to subscribers, 15s, to non subscribers, 21s

THE first of the twelve articles in this volume, which in addition contains the Proceedings of the Abernethian Society and the Paget Club, is a sympathetic *In Memoriam* of the late Sir Francis Champneys, a many-sided man and distinguished outside his profession as a musical composer. He was the first to use Lister's antiseptic methods at the General Lying-in Hospital, and it is interesting to note that in an article in this volume on the chemical prophylaxis of streptococcal infections, Dr L P Garrod, bacteriologist to the Hospital, refers to his tests of fifteen germicides which show that lysol is unsuitable, whereas monsol, izal, cyllin, acriflavine, and the combination of brilliant green and crystal violet, known as "blue paint," are probably of value in midwifery practice. Professor H H Woollard explains the scientific basis for ablation or section of the sympathetic supply of muscles in spastic paraplegia, and Mr W J H M Beattie gives an admirable account of achalasia of the cardia due to degeneration of Auerbach's plexus in the walls of the oesophagus. Mr Raven provides a useful article on cancer of the oesophagus and Mr R Phillips a valuable review of buccal cancer. Dr Wilfred Shaw and Mr J H Johnston's experimental research into the production of metastatic ovarian tumours throws some doubt on the usual view that it is due to gravitation spill. In a generously illustrated article, Mr R T Payne sets out the technique and applications of sialography or the demonstration of the salivary ducts by means of injection of substances opaque to X-rays, and Mr Girling Ball and Mr Payne deal similarly with excretion pyelography. Mr Hosford writes on fractures, and Drs Maxwell and Franklin on the cause of death in chronic renal disease.

# Preparations and Inventions

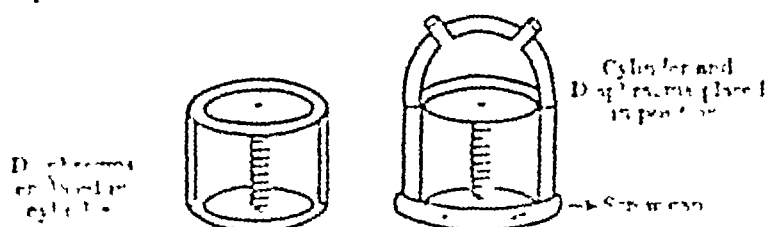
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Surgical diathermy is now being widely employed with satisfactory results in breast amputation, thyroidectomy, abdominal and thoracic surgery and other operative procedures, and although many types of apparatus have been introduced for the coagulation of tissue and, latterly, for cutting by means of the diathermy current, up to the present none has been entirely satisfactory. This new instrument, the "chirotherm," has many advantages in it the tungsten spark gap has been discarded in favour of the thermionic valve, with which there is no limit to the power available, while it operates automatically and requires no attention, moreover, it can be successfully operated by a nurse with little or no experience. The instrument has been produced in collaboration with surgeons experienced in diathermy, and in a demonstration which was given to us it certainly seemed to fulfil all the claims made for it.

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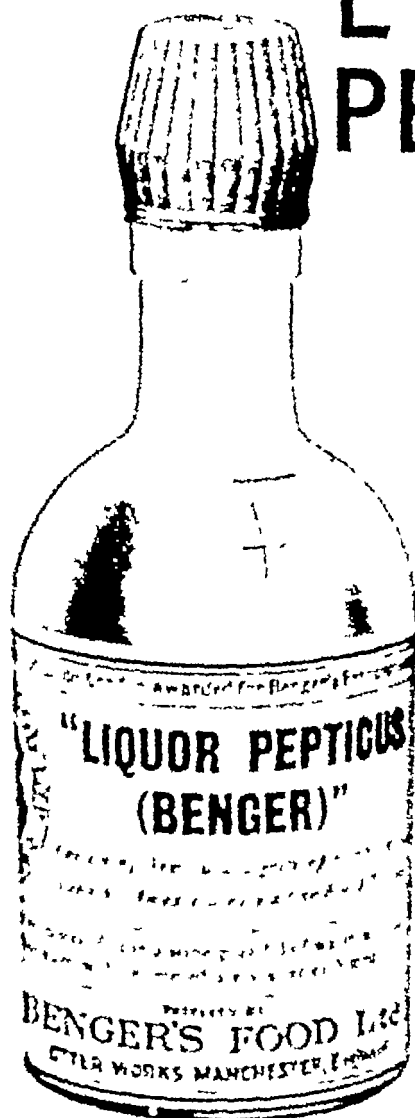
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Communications relating to the Editorial Department should be addressed to the EDITOR.

Original articles, clinical lectures, medical society addresses, and interesting cases are invited, but are accepted only upon the distinct understanding that they are published exclusively in THE PRACTITIONER. Unaccepted MS. will always be returned.

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## *The Serum Treatment of* **ULCERATIVE COLITIS**

3

**T**HE researches of Bargen and his co-workers at the Mayo Clinic on ulcerative colitis led them to advance the view that a non-hemolytic streptococcus is the factor of primary etiological importance in this disease. Later work has done much to confirm the original findings.

In consequence, it has been possible to develop a specific Ulcerative Colitis Antistreptococcus Serum which has been used clinically with very favourable results.

In the preparation of this serum Parke, Davis & Co follow the method developed by Bargen and have the advantage of using fresh cultures supplied by Bargen himself.

The dose of the serum should not be more than 2 c c to commence with, and this may be increased up to 5 c c injected either intramuscularly or intravenously, at intervals of 12 hours.

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Horlick's Malted Milk is valuable in all conditions associated with acidosis. Its regular inclusion in the diet will prevent and relieve morning sickness, aids the formation of regular bowel habits, and ensures the maintenance of an adequate flow of milk. It is also a valuable aid in the treatment of digestive disturbance.

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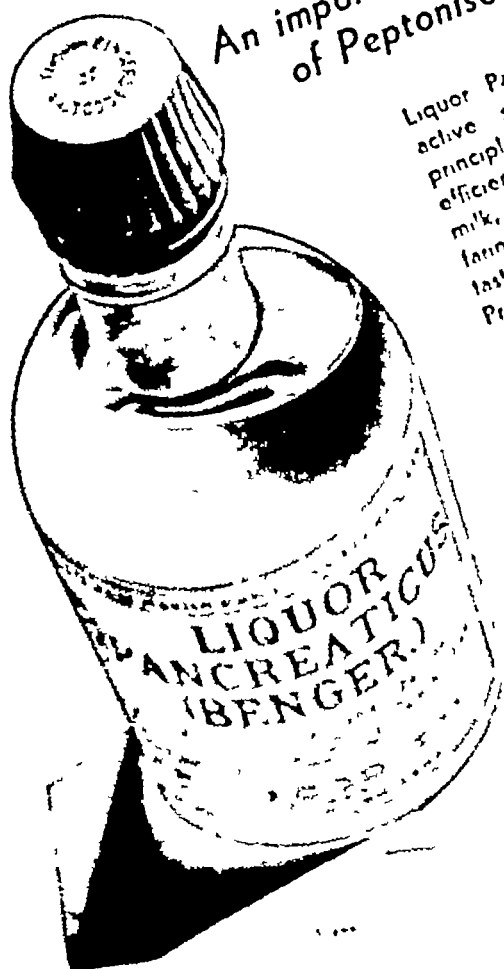
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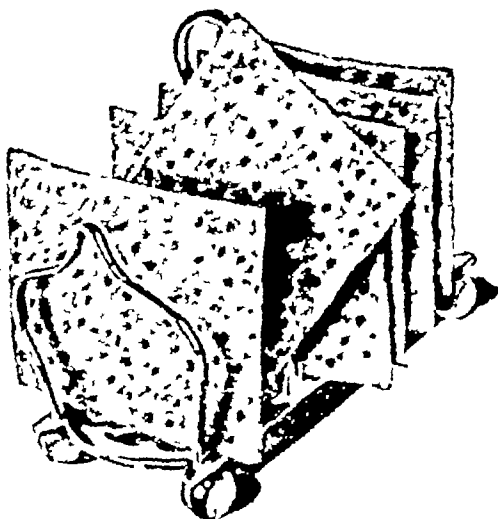


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Horlick's Malted Milk is valuable in all conditions associated with acidosis. Its regular inclusion in the diet tends to prevent and relieve morning sickness, aids in the formation of regular bowel habits, and ensures a sufficiency of calories for an adequate flow of milk from the breast without causing digestive disturbance.

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## *The Serum Treatment of* **ULCERATIVE COLITIS**

3

**T**HE researches of Bagen and his co-workers at the Mayo Clinic on ulcerative colitis led them to advance the view that a non-hæmolytic streptococcus is the factor of primary etiological importance in this disease. Later work has done much to confirm the original findings.

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In the preparation of this serum Parke, Davis & Co follow the method developed by Bagen and have the advantage of using fresh cultures supplied by Bagen himself.

The dose of the serum should not be more than 2 c c to commence with, and this may be increased up to 5 c c injected either intramuscularly or intravenously, at intervals of 12 hours.

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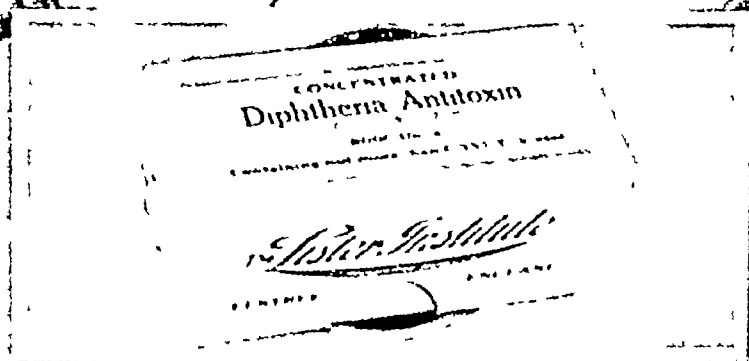
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# IODINE THERAPY

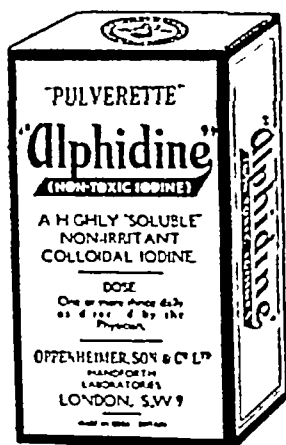
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3

In many of the wasting diseases of childhood, a sensitive, irritable stomach and intestines preclude proper nourishment.

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## ANGIER'S EMULSION

THE LARGEST AND MOST COMPLETE EMULSION OF PETROLEUM

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It is admitted that the large majority of patients suffer from the direct or indirect effects of constipation. It is often difficult to educate them to combat these evils. Some are ignorant, others apathetic, while many of them dread the griping pains and weakness occasioned by the ordinary laxatives. Sal Hepatica is pleasant to take and both prompt and painless in action. It maintains the biliary secretion in a healthy fluid state and ensures freedom from congestion and firm but subservient inflammation of the gall bladder which is a frequent common ailment, especially among sedentary workers. Sal

Hepatica does not cause acid indigestion or diarrhoea. It is the effective latest scientific remedy for constipation.

Sal Hepatica contains sodium sulphate, sodium phosphate, sodium chloride and lithia citrate in an effervescent medium.

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# Hepatica

the proved medicinal saline laxative & cholagogue



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'Bynol' contains 30% by volume of the 'Allenburys' 'Perfected' Cod-Liver Oil intimately commingled with the 'Allenburys' Malt Extract, thus producing a rich, easily digestible and palatable product. Cod Liver Oil is the richest available natural source of the fat soluble growth-promoting and anti infective vitamin A and the anti rachitic vitamin D. The 'Allenburys' 'Perfected' Cod-Liver Oil has been examined biologically and certified as fully active with regard to the vitamins A and D.

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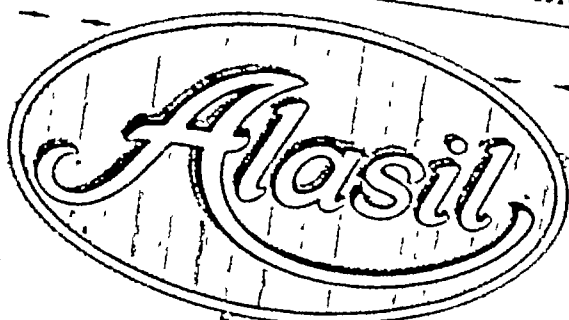
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*For  
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"Alocol" (Colloidal Hydroxide of Aluminium) provides an antacid medicament far superior to subnitrate of bismuth, bicarbonate of soda and other alkalis. These merely afford a certain degree of ease, without bringing about a permanent relief of the condition.

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*For  
Gastric  
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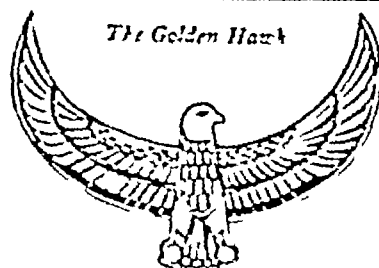
"Alocol" has been subject to extensive clinical trial, and literature giving full particulars of the results will be gladly sent to medical men on request.

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'Ovaltine' completely meets the requirements of the diet of the nursing mother by providing adequate and appropriate nourishment.

It is easily digested, wholly nourishing and does not convey any noxious or unpalatable substances to the breast-milk. For these reasons 'Ovaltine' will be found most dependable for establishing galactosis.

'Ovaltine' is recommended to be given about the sixth month of gestation and should be continued throughout the nursing period. A rich milk secretion is thus encouraged and the health of the patient safeguarded against overstrain.

As an example of the nutritive power of 'Ovaltine' it may be stated that one cupful yields more nourishment than 3 eggs or 12 cups of beef tea.

No better diet reinforcement can therefore be chosen for safeguarding the health of the mother and the development of the child.

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TONIC FOOD BEVERAGE

*Prepared by Anglo-Siam Corporation, Ltd., London, England*

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"CRISTOLAX" is worthy of careful trial in all cases of constipation. It is composed of 50 per cent of the purest medicinal paraffin in combination with 50 per cent of "Wander" Dry Malt Extract. The paraffin content acts mechanically for expelling the faeces, while the high diastatic property of the malt extract assists digestion and improves nutrition.

Where the patient has been accustomed to use an ordinary laxative regularly it is recommended that this should be continued in diminishing doses with the 'Cristolax' treatment. It is quickly found that the "Cristolax" method of in-

testinal lubrication will alone ensure adequate and regular defecation.

Patients highly approve the pleasant flavour of "Cristolax," the complete absence of oiliness and its cleanly form.

**'CRISTOLAX'**  
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MALT EXTRACT WITH PARAFFIN  
*Lubricant-Laxative-Nutrient-Digestive*

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In preparing Lactogen, the liquid milk is fortified with natural milk sugar—the sugar most suitable for infant feeding—to bring it up to normal breast milk standard.

Lactogen is a modified dried milk for use in infant feeding—prepared in England by Nestlé's, from the rich, pure milk of selected English herds.

For further information  
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Lactogen is sold  
in 1 lb. tins and  
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Sialogram of stomach showing presence of  
ulcer on lesser curvature

TRADE MARK **'BAROLAC'** BRAND  
BARIUM SULPHATE SUSPENSION

Contains 30 per cent of 'WELLCOME'  
BRAND BARIUM SULPHATE Requires no  
suspending agent, thus ensures greater  
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Winchester  
Quart bottles  
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Yields a clear-cut shadow

No sedimentation after administration

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SODIUM TETRAIODOPHENOLPHTHALEIN  
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For Oral Use

Boxes con-  
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Presented in two tubes, the contents of  
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Prices in London to the Medical Profession

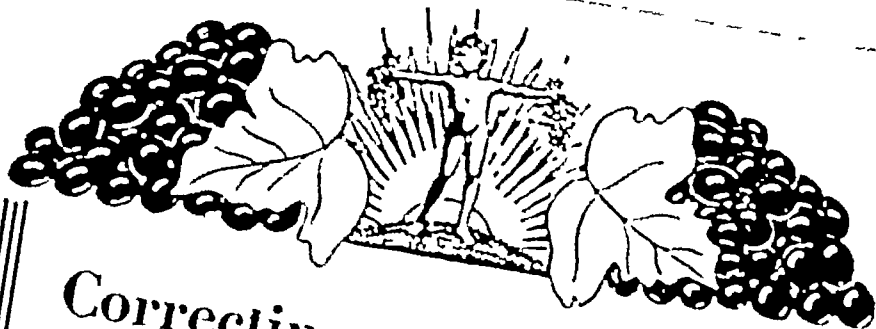


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## Correcting and Preventing Constipation During Pregnancy

A distinguished obstetric surgeon has laid it down that "constipation plays a leading part among the so-called minor ailments of pregnancy." The same authority advises that "simple methods which are physiological and harmless" should be adopted in order to secure two or three easy movements a day, these methods being persisted in until a regular habit is established.

It is desirable that the first of these evacuations should take place before breakfast, and this may easily be brought about by taking, first thing in the morning, a spoonful of ENO'S "Fruit Salt" in half a pint of water, following this by a cup of tea. If necessary, further doses may be taken before the subsequent meals.

ENO'S "Fruit Salt" is a carefully prepared combination of fruit acids with alkalis, and is entirely free from the harsh and nauseating sulphates of soda and magnesia. It acts by detaching food in the alimentary canal—according to the law of osmosis. Unlike most aperients, it promotes peristalsis, not by chemical irritation of the nerve endings, but by the natural method of paralytic action. It is therefore particularly suitable for use during pregnancy. ENO'S "Fruit Salt" has the additional merit of being agreeable to the palate, and is quite free from violent purgative and flatulencies.

# ENO'S "FRUIT SALT"

Prepared by J. C. ENO & CO., LTD.,  
LONDON, ENGLAND.

# THE PRACTITIONER

No 772

OCTOBER, 1932

Vol CXXIX

## Diathesis, or Variation and Disease in Man

By JOHN A RYLE, MD, FRCP

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IN the year 1884 Jonathan Hutchinson published a series of six lectures on "Temperament, idiosyncrasy and diathesis," suitably entitling his book "The Pedigree of Disease" and dedicating it to the memory of Charles Darwin. His opening lecture includes the following sentences: "Our forefathers, who knew far less about the details of pathology than we do, attached far more importance to such matters as temperament and diathesis. They were accustomed to prescribe for a man's temperament, we think only of his disease, and turn aside with weariness from classifications of diathesis in which the physicians of an older day delighted. Although to a large extent this change of sentiment has been the result of advance in knowledge, yet I think it might easily be shown that it has gone too far, and that we now neglect unwisely the study of those differences between man and man of which, for the most part, physiology takes no cognizance, but which may yet prove of much importance in modifying the processes of disease."

Less than ten years ago these words could have been re-written with equal truth, for the whole subject of constitution as a factor in morbidity had continued to suffer a curious neglect at the hands of our profession. This neglect was in part due to the birth and growth

of bacteriology with its concentration on the extraneous causes of disease, and in part also to the perfection of biochemical and histological methods and a pre-occupation with the intimate processes and effects of disease which these in turn engendered. It is true that physicians have never omitted to place a certain reliance upon family histories, and that the genetics of a few rare maladies have been carefully and profitably studied. Until recently, however, there was little direct inquiry into the problems of constitutional predisposition and immunity. Indeed, the whole doctrine of diatheses was by some subjected to a measure of ridicule which a closer attention to the teachings of Darwin and his disciples might at any time have discountenanced.

In the last few years Draper in the United States, and in this country Garrod, Hurst, Rolleston, Langdon Brown and the writer of the present paper have endeavoured to revive interest in the study of "those differences between man and man" which are associated with, or concerned in maintaining a liability to or freedom from some common forms of disease. Medicine owes much to genetics and genetics owe not a little to medicine. In the future we shall look to a closer co-operation between geneticists on the one hand and students of human physiology and pathology on the other. From the physiologists in particular may we not expect a better attention to the problems of individual physiology and a clearer recognition of the fact that for no particular structure or function is it possible to establish an absolute standard of normality? Although the variations about the mean may be slight indeed they are sometimes of the greatest importance in that they serve to shape the destiny of the individual, for better or for worse, in his conflicts with his environment.

Most characteristics are transmissible from one generation to another in accordance with the same laws

as those affecting the transmission of favourable or neutral characters. They may be conveniently subdivided into: (1) Morbid structures, (2) Morbid functions, and (3) Morbid dispositions. Between these the differences are, perhaps, more apparent than real, for inherited morbid functions, such as colour-blindness and hæmophilia, probably depend upon minute differences of cellular or molecular structure, and a morbid disposition or diathesis may be said to represent an unusual or variable function or reaction in the presence of environmental stress.

Hare-lip, supernumerary digits and achondroplasia are examples of heritable structural defect. Colour-blindness and hæmophilia have already been cited as examples of inherited physiological flaw. All of these are present at birth, and, unless they be surgically corrigible, persist through life. Morbid dispositions include those peculiarities of tissue or tissue-response which carry with them in a subject healthy at birth and sometimes throughout life a low immunity to the tubercle bacillus or other bacteria, or a liability, especially in adult life and in the presence of certain habitual or environmental influences, to such chronic or relapsing diseases as gout, asthma, migraine, epilepsy, hyperpiesia, duodenal ulcer, and pernicious anæmia. Here we are only concerned with the morbid dispositions or diatheses. Before discussing these in closer detail certain definitions of terms reclaimed for proper usage are desirable.

#### CONSTITUTION AND DIATHESIS

By the term *constitution* should be understood the sum-total of inborn qualities, anatomical, physiological, psychological and immunological, of which the individual is compounded, or his whole endowment from the parental germ-plasm. By a *constitutional disease* we should therefore imply not a general as opposed to a local disease, but one dependent upon peculiarities

of constitution or the qualities of the germ-plasm.

*Diathesis* is described in Dorland's medical dictionary as "a natural or congenital predisposition to a special disease." Hutchinson<sup>1</sup> defined diathesis as "any condition of prolonged peculiarity of health-giving proclivity to definite forms of disease." In naming a particular diathesis we should couple the term with the disease to which the predisposition exists, such as the "gouty diathesis," and not with the constitutional peculiarities which are found in association with it. Hurst,<sup>2</sup> in describing the physical characteristics encountered in association with duodenal ulcer, has used the term "hypersthemic gastric diathesis." It would be more correct to speak of the "ulcer diathesis" and to state that it occurs in company with, or as a part of, the "hypersthemic constitution."

To maintain conformity with biological concepts I have suggested that a diathesis should be considered as "a variation in the structure or function of tissues which renders them peculiarly liable to react in a certain way to certain extrinsic stimuli." Sir Archibald Garrod<sup>3</sup> has been kind enough to give this definition his blessing in his recent monograph on inborn factors in disease.

#### VARIATION

We owe to Darwin the important conception of variation, for he showed that although, in the main, like begets like, there is also a constant tendency among species to vary in a greater or less degree and that under conditions of domesticity variability in animals is greatly increased. Naturalists have studied extensively the variability of wild forms, but this is generally slight as compared with the variability occurring, for instance, among dogs and domestic pigeons. Therefore, as Huxley<sup>4</sup> indicated, no real difficulty about the fact of variability inasmuch as the organism

propagated proceeds from two stocks with different qualities and prepotencies and "cannot be an exact diagonal of the two." The human race also shows wide variations, and in a nation or even in a single family we still find very perceptible and distinctive variations in respect of colour, stature, temperament, stamina, ability and longevity. These are in large part germinal, and in common with all true variations are transmissible from one generation to another. Is it surprising that we should find comparable variations in respect of liability or resistance to disease?

If a diathesis be regarded as a biological variation, and like all true variations, transmissible, it at once becomes comparable with such favourable variations as pave the way to longevity, athleticism, and high intellectual attainment. Further, it is only reasonable to argue the existence of unfavourable as well as of neutral or favourable variations. It could scarcely be otherwise. Above and below the mean or average and most convenient stature there must be within certain limits every conceivable variation of stature. And above or below the mean or average resistance to tuberculosis, or power to metabolize or excrete uric acid, there must within certain limits be every conceivable quantitative variation. At the extremes we meet with peculiar resistance or susceptibility to the disease in question. The case for diathesis may be put more tersely by saying that the more abnormal a man is within the limits of health and in respect of certain qualities, the more readily will he, in appropriate circumstances, be precipitated into a particular state of ill-health.

It must be clearly appreciated that *constitution* and *diathesis* are not interchangeable terms. Rather is the diathesis a part or a feature of the constitution. Physicians through the ages have recognized an association between certain diseases and certain types of physique or temperament or certain peculiarities of

texture or colouring. These traits are also a part or feature of the constitution. Their presence may help to the recognition of a diathesis, but for the most part they do not explain it. Thus, dark-haired, dark-complexioned people are more liable to constipation and abdominal disorders, and blue or grey-eyed subjects to the skin disease, psoriasis, but the dark hair and the blue eyes do not in any way explain these proclivities.

For a disease to be classified as constitutional, I would suggest that one or more of the following postulates are necessary: (1) A clear family history of the disease should be frequently obtained; (2) There should be frequently associated with it notable physical, physiological or psychological peculiarities (i.e. correlated variations); (3) Some peculiarity of structure or function present in health and capable of explaining the predisposition should be demonstrable.

I have elsewhere<sup>1</sup> discussed some of the arguments in favour of a constitutional factor in diseases as diverse as tuberculosis, rheumatic fever, scarlet fever, diphtheria, duodenal ulcer, 'visceroptosis,' hyperpæsia, angina pectoris, gout, asthma, migraine, epilepsy and pernicious anaemia. In relation to some diseases we recognize at present only the fact of greater or less immunity or predisposition in certain families or races. In relation to others we recognize a definite tendency for the predisposition to be passed on immediately through the generations. In relation to others, again, we may add the occurrence of correlated variations in the shape of peculiarities of colouring, physique or temperament. Finally, in a few we can go further still and put a finger upon the actual anatomical or physiological variant which seems to explain, at least in part, the particular predisposition.

I propose to continue my list to two diseases, already treated in some of the connections by Hurst,<sup>2</sup> viz. cancer and leukaemia, employing our three postulates.

recognize simultaneously the occurrence of positive family histories, of correlated variations, and of a peculiarity of function, discoverable both in patients and in the course of an investigation of healthy subjects, which appears to provide a reasonable, if partial, explanation of the actual proclivity.

### THE ULCER DIATHESIS

In 1921 Izod Bennett<sup>6</sup> and I performed fractional gastric analyses on one hundred healthy male medical students. The extremes of variability in their curves of gastric acidity are shown in the accompanying chart. Eighty per cent. of the total were found to

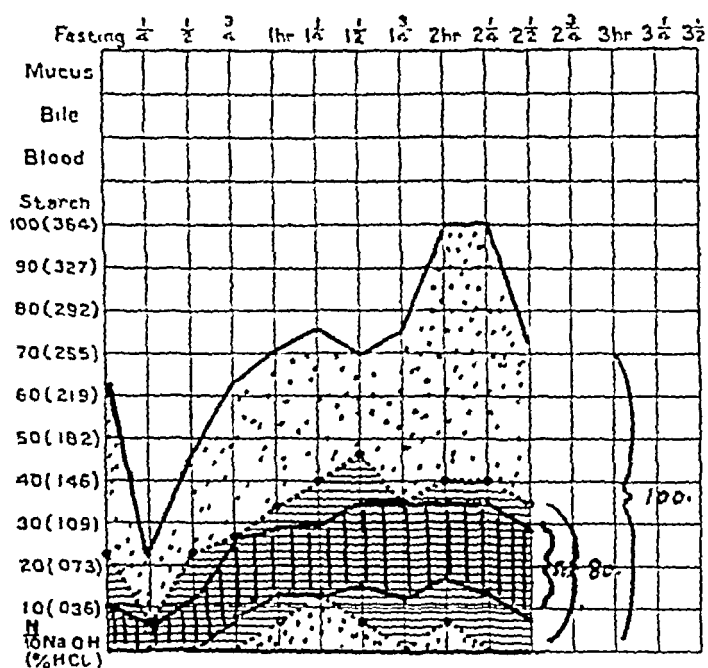


FIG. 1—Variations in Gastric Acidity  
(Reproduced by courtesy of the Oxford University Press.)

give curves falling within the limits indicated by the transverse hatching, and this zone has been adopted as the "normal" standard for test-meal charts in clinical use. Eight healthy subjects gave curves of



acidity which, on previous experience, would have been regarded as pathologically high, and of these five were of the "climbing" hyperchlorhydric type which we now associate with duodenal ulcer.

Now the hyperchlorhydria of duodenal ulcer is not only present in the great majority of cases (70-80 per cent.), but is also constant in the individual and persists at all times whether the ulcer be active or quiescent. Experimentally in animals ulcers are perpetuated by an artificial hyperchlorhydria (Bolton). The suggestion that hyperchlorhydria, occurring as an inborn variation, is a predisposing factor to the birth, or at any rate to the perpetuation, of a duodenal ulcer becomes therefore a very reasonable hypothesis. But let us inquire into the other evidence for a constitutional factor in duodenal ulcer. First, in respect of family history, we obtain in at least 10 per cent. of all cases an account of one or more proved cases of duodenal ulcer in near relatives. In one case of mine the father of the patient, two uncles and a cousin; in another three brothers; and in a third a sister and two maternal cousins had been afflicted. If due allowance be made for the infrequent recognition of duodenal ulcer as a cause of dyspepsia in the last and preceding generations, the frequency with which the diagnosis is missed at the present day, and the numerous difficulties experienced in collecting and recording medical pedigrees, it seems probable that the true incidence of positive family-histories would be appreciably higher than 10 per cent.

In respect of correlated variations we find again and again that the victim of duodenal ulcer conforms to a distinct physical and psychological type, in which a lean, muscular, energetic and often robust habit of body accompanies a propensity for the cerebral and emotional activity or a worrying disposition. Radiologically the stomach is commonly of the short, "beer-belly" type, active and quickly emptying.

Even if it be admitted, as it must be, that external influences, including occupational stress, over-smoking, the colder seasons of the year, and infection, are essential additional or determining factors, it would yet seem just to claim that a native hyperchlorhydria, in concert with the other physical and psychological variants described, furnishes just such a deflection from the mean of healthy function as would be calculated to predispose to this disease

#### THE PERNICIOUS ANÆMIA DIATHESIS

In the series of healthy students referred to above there were four whose stomachs were found to be devoid of all secretion of hydrochloric acid. Hurst<sup>2</sup> has argued that a considerable proportion of all cases of pernicious anæmia are consequent upon an inborn or constitutional achylia. Achylia gastrica is almost constant in this disease and is now generally accepted as an essential etiological factor. Pernicious anæmia may also complicate the artificial achylia of gastrectomy. In support of his view, Hurst adduces (1) The occurrence of achylia in a small proportion of healthy individuals; (2) the more frequent occurrence of achylia in the families of patients with pernicious anæmia; and (3) some striking examples in which pernicious anæmia has appeared in two or more members or generations of one family. There are, furthermore, certain correlated variations which lend colour to the constitutional hypothesis in the case of pernicious anæmia. Addison<sup>8</sup> noted that it occurred "chiefly in persons of a somewhat large and bulky frame, and with a strongly marked tendency to the formation of fat." Draper<sup>9</sup>, with anthropometric studies, demonstrates a type of chest, generally deep, wide and short, which he claims as peculiar to victims of the disease.

Thus in two very diverse conditions, duodenal ulcer and pernicious anæmia, we find support for the idea of

constitutional predisposition (a) in the family history, (b) in the association of certain correlated variations (which proclaim a "type" but do not in themselves explain the predisposition), and (c) in the occurrence of remarkable biochemical variations which (in the light of recent research) go a long way towards explaining the liability. If it were possible to chart in a similar manner the degrees of variability in respect of other functions of the body it is probable that we should discover divergences comparable to those shown in the case of gastric acidity, and that at the two extremes we should find an increased and diminished liability to certain types of injury or disease.

Is it not probable that the metabolism of purine bodies, if it could be measured and charted in the same graphic way, would be found in a long series of young and healthy individuals to show wide variations, and among the extremes might we not anticipate a pronounced liability to, or immunity from, gout in later life? Some day it may even become possible to "measure" the susceptibility of the young to tuberculosis just as we can in some degree already, with the Schick and Dick tests, reveal a great or little liability to diphtheria or scarlet fever. In this event it is scarcely to be doubted that, together with familial liability or freedom and in association with distinctive physical types, we should find a parallel positiveness or negativeness in our tests.

Idiosyncrasies to food stuffs and drugs, whatever their intimate physiological basis may be, are in the same category as diatheses. Indeed Hutchinson described idiosyncrasy, as Rolleston<sup>10</sup> has lately reminded us, as "diathesis brought to a point."

Whatever part external stresses may play, variations in psychological equipment undoubtedly do much to determine the degree of liability to the common mental and physical diseases.

The study of constitution and diathesis is one of

abounding interest and real practical value. We must needs observe the temperament, peculiarities and individual reactions of our patients and of their near relatives with a constant watchfulness if we are to preserve a just balance in the departments of diagnosis, prognosis and treatment. In assessing, in respect of any disease but especially of the more chronic forms, the etiological contribution of sex, season, occupation, environment and infection, we can never afford to neglect the abiding contribution of original hereditary endowment. There are better inspirations to thoughtful medicine to be found in the "Origin of Species" than in a modern textbook of bacteriology. To physiology, let me repeat, we are surely entitled to look for future help in the shape of organized research into the whole problem of human variability. Few problems offer better prospects for a fruitful partnership between physiology and clinical medicine. The proper study of mankind, in sickness and in health, is always man.

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# General Aspects of Hereditary Disease

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MANY circumstances have conspired in recent years to focus attention upon the genetic processes of human beings. The sense of insecurity generated by the War has provoked a host of speculations, prophecies and warnings about our national and racial future. In all of these, the population problem, in its qualitative no less than its quantitative aspects, has loomed large. The development of Public Health Services has emphasized, from the medical standpoint, the need for the prevention as well as for the cure of disease. The growth of our various Social Services, particularly of health and unemployment insurance, has shown how great can be the cost to the State of the irresponsible reproduction of some of its citizens. With a dissemination of philanthropic and humanitarian ideals has come a realization of the suffering that can be caused both to parents and children by ill-regulated procreation, and the fact that a large measure of this suffering falls on the shoulders of women has not been left unnoticed by spokesmen of the feminist movement. Lastly, with the spread of scientific humanism, it has become widely recognized that man's increasing control of his environment may now be extended to cover his racial future. These various movements of thought have jointly created an enhanced sense of the responsibility of parenthood which has already made several contacts with medicine.

The contacts are likely to be increasingly felt by the general practitioner to whom the public will turn more readily than to any other person for guidance in the problem of heredity. If a person contemplates

marriage has ancestors or collateral relatives who suffer from a given hereditary disease, defect or disability, and consults a doctor with a view to obtaining advice on how he should proceed, he is likely to ask one of the following three questions :—

“ Ought I to get married ? ”

“ If I get married, ought I to have children ? ”

“ If I get married and have children, what are the chances of their having the defect ? ”

It will be clear that if either of the first two of these questions is asked, a double responsibility is placed upon the doctor. In the first place he is expected to form a private estimate of the probability of the defect appearing among the children, and secondly he is desired to advise the patient as to what course he should take. When the question is put in the third form, the first only of these responsibilities is incurred. The doctor is here asked to inform his questioner of the probability of the defect appearing in the offspring, and is not expected to advise him what to do. The patient is prepared to decide whether he does or does not become a parent. But whichever way the question is put, it will be clear that the doctor is expected to be able to furnish an estimate of probability.

In the present state of our knowledge of the inheritance of most of the commoner diseases such an estimate is by no means easy to give. It will be especially difficult to give if the doctor is ignorant of the important and rapidly growing science of genetics. In the past curricula of most medical schools in this country little was taught upon this subject, so that most doctors who have not recently qualified are largely ignorant of it. A short exposition of the principles of Mendelism in so far as they are relevant to the inheritance of the morbid conditions to which man is subject will not therefore be out of place.

Our knowledge of heredity in nature is the result of

extensive and carefully controlled breeding experiments in animals and plants. Considerable accuracy can, in the long run, be obtained in these controlled experiments as a result of three circumstances which are impossible to reproduce in man. First, large numbers can be bred in each generation. This desideratum is especially well satisfied in experiments on plants and insects. Secondly, most of the satisfactory experimental organisms breed quickly. Thirdly, it is possible to arrange all kinds of experimental matings with nearly related individuals. The back crossing with the parental generation is especially important in this connection. No animal conforms less satisfactorily to these requirements than Man. Human families—at any rate in Western countries—are becoming progressively smaller with each generation. Man is a very slowly breeding animal, particularly in Western countries, where late marriages are the rule. And consanguineous matings of precisely those kinds which throw light on genetic constitution are forbidden by law. The study of heredity in man, therefore, bristles with difficulties, and only in a small percentage of somewhat rare diseases and defects are the genetic mechanisms understood with any approach of accuracy.

In what follows, an attempt will be made to indicate how the practitioner should proceed in order to ascertain whether a given abnormality conforms to the hypothesis of Mendelian dominance, recessiveness or sex-linkage.

#### DOMINANCE

The principle of dominance will be illustrated from the experimental material from which the principles of Mendelism were first deduced. If a tall pea which, when self-pollinated, produces only tall plants, be crossed with a dwarf pea (which also only reproduces its own type), the whole of the generation yielded by the crossing will consist of tall plants. This generation is usually known as the *F*<sub>1</sub> generation. If the tall

plants of this F<sub>1</sub> generation be cross-fertilized or self-pollinated, there will result an F<sub>2</sub> generation, in which tall and dwarf plants appear in the ratio of 3 : 1. The dwarf plants, when self-pollinated or crossed with other dwarf plants, yield nothing but dwarfs. But the tall plants when self-pollinated do not behave alike. On average, one-third of these (one-quarter of the total F<sub>2</sub> generation) will yield nothing but tall plants. The remaining two-thirds (one-half of the total F<sub>2</sub> generation) will, when self-pollinated, behave as did the members of the F<sub>1</sub> generation. That is to say, that on average, they will give rise to three tall and one dwarf plant. It will therefore be clear that in its transmission tallness is here prepotent over dwarfness, and the terms "*dominant*" and "*recessive*" have been applied to two characters which are genetically antithetical, or *allelomorphic*, in this way. It will further be clear that tall plants, when self-fertilized, do not all behave alike. Some produce nothing but tall plants and others produce tall and short plants in the ratio of 3 : 1. The following diagram in which "D" stands for dominant tallness, and "R" for recessive dwarfness, illustrates what happens:—

	DD (tall)	×	RR (dwarf)
F 1	all DR (tall)		
F 2	1 DD (tall)	2 DR (tall)	1 RR (dwarf)

(These ratios represent averages attained after very many pollinations)

FIG 1

The tall plants of the constitution DD are called "pure dominants" and are said to be *homozygous* for the character of tallness. The tall plants of the constitution DR are called "impure dominants" or hybrids, and are said to be *heterozygous* in respect of tallness. The *homozygous* and *heterozygous* forms are here outwardly or somatically indistinguishable. They differ genetically, however, in that the homozygous plants



when self-fertilized breed true, whereas the heterozygous give rise on average to three tall and one dwarf plant. They therefore "carry" in genetically latent form the character of shortness. The hybrid or heterozygous tall plants are therefore said to be carriers of the recessive character of dwarfness.

The crossing between the heterozygous or hybrid tall pea with the recessive dwarf is also of great importance for the understanding of human hereditary processes. It can be represented diagrammatically as follows:—

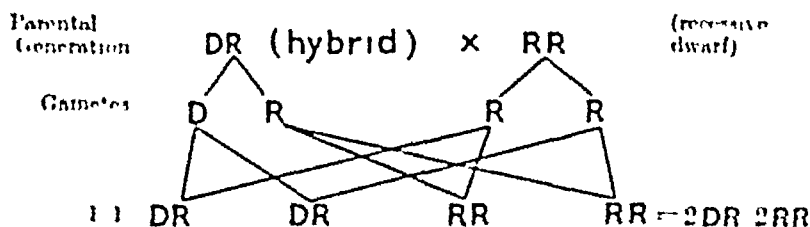


FIG. 2.—In this diagram the gametes of the parental generation are diagrammatically shown. This representation presupposes a knowledge of Mendel's Law of Segregation, which there is not space to discuss in this article. The essential point (to be referred to again below) is that in the cross between a hybrid and a recessive there appear on average in the F<sub>1</sub> generation equal numbers of hybrids and recessives.

That is to say, on average, hybrid tall plants and recessive dwarf plants are produced in equal numbers. Similar breeding experiments carried out on other plants and on animals have shown that the homozygous and heterozygous forms are not, in all cases, indistinguishable. The heterozygous forms, while on the whole resembling the dominant parent, may show certain characteristics of the recessive parent. If the heterozygous form were exactly intermediate between the two parents, it would clearly be impossible to say which parent had the dominant character.

In the instance here selected of tallness and dwarfness in peas, we are dealing with a single hereditary character which conforms to simple Mendelian law. In human beings there are probably thousands, perhaps hundreds of thousands of such characters (or genes, as they are now called), the vast bulk of

which are yet unrecognized and unidentified. They co-operate in highly complex ways to produce the various end-results which we describe in anatomical, physiological and biochemical terms. Many of the agglutinating reactions of the blood seem to be determined by such genes, and in the inheritance of some of these reactions Mendelian ratios have been detected. In the measure that a given structure or function is influenced by many genes, so will the complexities of its inheritance be difficult to unravel. They will prove especially difficult in man, where controlled experiments are impossible.

For obvious reasons the human characteristics which have lent themselves best to genetic study have proved to be gross anomalies of structure or physiological behaviour. The appearance in successive generations of club foot, hare lip, cataract, hæmophilia or night-blindness, can hardly escape notice. Such conditions were in fact as easily recognizable by our remote ancestors, who were unequipped with the refinements of scientific technique, as they are by ourselves. But the discernment of the mode of inheritance of diabetes had to await the discovery of methods for detecting sugar in the urine (before this event, diabetes was confused with other wasting diseases); and the recognition that human blood-groups conform to certain principles of inheritance was not possible until the necessary hæmatological methods had been evolved. Instances could be multiplied of how we have only learnt to appreciate the true character of many hereditary characteristics in recent years. For which reason, reliable pedigrees are often short.

In the meanwhile, the following practical points in connection with the spotting of a dominant character are worth noting. In the ordinary course of events, attention is only directed to the inheritance of a given character if that character is in one way or

as Mendelian recessives are rare. Hence Mating 1 will be very rare, and Mating 2, though less rare, nevertheless uncommon. Most cases of recessiveness are the outcome of the union of two outwardly normal parents who, genetically, are heterozygous carriers. In this case, a recessive trait will appear capriciously and suddenly in a pedigree which, outwardly at least, is little affected by it. The frequency with which carriers of a recessive trait exist in a community can be simply calculated from the numbers of persons who exhibit

this trait. Thus if  $\frac{1}{N}$  be the frequency with which exhibitors of the trait (recessives) appear in the community, the number of carriers in that community

is  $\sqrt{\frac{1}{N}}$ . For example, if one recessive exhibitor occurs in every 10,000 persons in a community, the number of carriers of the trait will be  $\sqrt{\frac{1}{10,000}}$ , i.e. one in a

hundred. Now deaf-mutism not infrequently appears as a recessive. If then the incidence of recessive deaf-mutism in a community were  $\frac{1}{6,400}$  (which it is

not, the precise incidence is not known in this country), there would be  $\sqrt{\frac{1}{6,400}}$  or one in eighty carriers of the

condition in the community. Suppose then that a practitioner were asked what were the chances of a deaf-mute married to a normal person producing deaf-mute children. He would recognize that such children could only appear if the spouse were heterozygous in respect of deaf-mutism, thus carrying the defect. The chances of this in the hypothetical instance here related would be one in eighty. If the spouse were unfortunate enough to be heterozygous, the chances are that half the children would be deaf-mutes, and the other half carriers. If the spouse were

not a carrier. none of the children would be deaf-mute, but they would all be carriers

If, therefore, a recessive trait is rare in a given community. it will only be carried by certain stocks. It will only appear if members of these stocks happen to mate with members of other carrier stocks, or if two members of the same carrier stock intermarry. Cousin marriages are not infrequent in all communities, and are relatively more frequent in those countries where elements of the population are localized by certain natural barriers (as happens in valleys in mountainous regions or on islands) or when the choice of mate is limited by religious or social considerations. In fact, the inheritance of recessive traits has been most fruitfully studied in communities where inbreeding has been promoted by geographical or social factors. If carriers of a recessive trait are rare, it will be found that cousin marriages occur in the ancestries of those much rarer persons who *exhibit* the trait with much greater frequency than they occur in the average of the population. Hence the practitioner who suspects a given abnormality of being recessive should carefully scrutinize the ancestry of the individual showing the abnormality in order to ascertain whether consanguineous marriages have anywhere taken place. And he should seriously warn the exhibitors of those abnormalities or their relatives not to contract consanguineous marriages.

#### SEX-LINKED INHERITANCE

This type of inheritance is more complicated than either of the foregoing and is most clearly understood in terms of the chromosome theory. An exposition of this theory, even for the present purposes, cannot be compressed within the limits of this article, and the reader anxious for more information should consult a good textbook, such as that of Professor R. R. Gates, "Heredity in Man," pp. 17-27. Briefly, the

families had been larger and the records of ancestors more complete, it would probably have been clear that the possibilities were stretched too far and that the mode of inheritance could not be interpreted on simple Mendelian hypotheses. The second factor is that in medical journals that cover the whole field of medicine, surgery and gynaecology, only a limited space can be allotted for the publication of pathological human pedigrees. This limited space naturally comes to be filled with pedigrees showing features of interest. Of these features, much the most striking is conformity to a simple Mendelian hypothesis. There tend, therefore, to get published pedigrees which conform to Mendelian principles rather than pedigrees that do not. At the same time, the error must be avoided of dogmatically asserting that because a given mode of inheritance does not conform to *simple* Mendelian rules, the inheritance is not Mendelian. It may be possible or even probable that several Mendelian factors are involved and that if we understood these factors we should recognize that their inheritance conformed to Mendelian principles. This error is especially noticeable in the works of writers on mental deficiency.

The above-noted limitations, for purposes of genetic study, of the material furnished by contemporary human beings are such that it is practically impossible to say with certainty of a given pedigree that the mode of inheritance it exemplifies is one of Mendelian dominance or recessiveness. This can only be stated with an approach to finality after a large number of other pedigrees illustrating the abnormality in question have been analysed and compared. The limitations of human material above noted (the small sizes of the families, the slovenliness of the breeding, the scantiness and inaccuracy of the records) can only be effectively counteracted if large numbers of pedigrees are analysed. One factor in individual pedigrees will then be cancelled by chance factors of an opposite kind in

other pedigrees, and the larger the collection the greater the approach to probable accuracy. This process of analysis falls entirely outside of the province and capacity of the average medical practitioner. It is a highly specialized procedure demanding an intimate knowledge of genetics and a considerable knowledge of mathematics. These demands are now being met by a new type of scientific investigator which has only recently come into existence—the genetical statistician. The names of R. A. Fisher, J. B. S. Haldane and L. Hogben at present stand out in this field. The last is now engaged in writing a series of valuable, though highly technical, papers in the *Journal of Genetics*, under the title of "The Genetical Analysis of Familial Traits."

What is especially demanded is a central organization on which are represented medical practitioners, through whom alone pathological human pedigrees can be satisfactorily collected, and genetical statisticians who can undertake the task of analysing and interpreting, on a general scale, the material collected for them by others. It is of the first importance that such an organization should have a journal in which could be published, not selected pedigrees, but *any* well authenticated pedigree whatever the mode of inheritance it exemplified. To such an organization the practitioner could turn when he found himself in difficulties, and from it he could obtain an opinion not only on his pedigree as judged on its own merits, but also as judged in the light of other published pedigrees of the same abnormality.

# The Constitutional Factor in Diseases of the Blood

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THERE can be few chapters of medicine in which constitutional factors assume greater importance than that which deals with the diseases of the blood. Many of these diseases are purely hereditary and among them can be found examples to illustrate most of the ways in which a defect may be transmitted in accordance with the Mendelian hypothesis. In others of these diseases heredity and environment each play their part, environmental factors acting on an organ which is hereditarily vulnerable, so that the morbid results of the defect do not become apparent until later life and the hereditary factor is easily overlooked. In other cases again large numbers of men and women are exposed to the same harmful agencies and yet in only a few do the blood-forming organs break down under the strain, so that we feel compelled to postulate a constitutional difference in these individuals though its nature is still obscure.

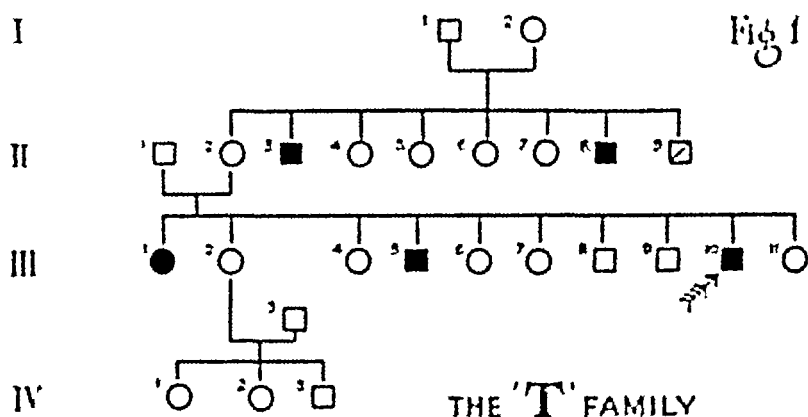
Approaching the problem in this way we may first of all discuss the various congenital dystrophies of the blood-forming organs. These may involve the plasma, the cells, or the vessel walls. In *haemophilia* the site of the hereditary disease is apparently the plasma, whose protein complexes are unduly stable, so that the blood does not clot at ordinary temperature. This may be a persistence in adult life of the embryonic condition of the plasma in arrest of development which can be normal in many hereditary diseases (Pfeiffer's). It is inherited as a sex-linked recessive.

being manifested only by males and transmitted by females. In the narrow section of the hæmorrhagic diseases we have, however, other hereditary maladies which are at least as common as hæmophilia. Over twenty years ago Osler separated off the condition known as *hereditary multiple telangiectasia* (Hurst and Plummer). The cardinal feature of the disease is the presence of telangiectases in the skin, the mucosæ and the viscera. Epistaxis is the most common complaint, but external bleeding, hæmoptysis, gastrostaxis, hæmaturia or cerebral hæmorrhage may occur. In more than half the cases the telangiectases are noted in the first decade, but fresh lesions develop throughout life, and the symptoms tend to be aggravated in middle age. The disease is inherited as a Mendelian dominant.

More recently we have come to recognize a third form of hereditary hæmorrhagic diathesis, *hereditary purpura hæmorrhagica*, or *thrombasthenia* (Witts). In these cases there are no evident abnormalities in the plasma or the blood vessels, but the platelets are sometimes diminished and the disease is characterized by the symptoms which we are accustomed to associate with shortage of blood platelets—a tendency to purpura which can sometimes be induced by constricting the arm with a tourniquet, excessive bruising or bleeding from trivial injuries, spontaneous hæmorrhage from the mucosæ, and prolongation of the bleeding time. The condition usually appears early in life and it may grow less troublesome in later years. The disease passes directly from generation to generation and females are affected twice as frequently as males. It has been suggested that it is transmitted as a sex-linked dominant. In the diagram below I have given the pedigree of a family I was able to study, where the hereditary purpura hæmorrhagica was associated with thrombocytopenia. In this figure males are represented by squares and



females by circles, affected cases being blacked in. Cases of hereditary hæmorrhagic disease, whether due to hæmophilia, telangiectasia or thrombasthenia, are admittedly rare, but there can be little doubt that similar if more incommensurable defects are of importance in the symptomatic hæmorrhagic states. In the study of problems such as the occasional occurrence of purpura in scarlet fever, or of a hæmorrhagic diathesis in 0.6 per cent. of cases of malaria, some have been preoccupied with the exogenous factors when more might have been learnt by studying the individual and trying to reveal the nature of the weakness in his blood-forming organs.



A second group of congenital dystrophies affects the red cells themselves. Of these *acholuric jaundice* or *spherocytosis* is the most important in this country, but closely allied to it are the *sickle cell anemia*, or *drepanocytosis* of negroes, and the rare *ovalocytosis*. I consider the symptoms in the red diseases to be fundamentally due to hereditary abnormalities in the red corpuscles themselves. In *acholuric jaundice* they are more spherical than normal, of smaller mean diameter but greater volume, and in the great majority of cases they are less resistant to lysis by hypotonic saline than the normal corpuscles. They are all related to the concentration in the circulating blood, and the symptoms of the spleen, liver, and the jaundice result

from the accelerated destruction of these fragile cells. Similar conditions are present in sickle-cell anæmia, but in ovalocytosis anæmia is uncommon. All these are inherited as Mendelian dominants. In conclusion attention may be drawn to two points. The first is the occurrence of crises of blood destruction in acholuric jaundice and in sickle-cell anæmia, which can sometimes be clearly traced to an exogenous factor, such as pregnancy or an infection. The second is the fact that some 10 per cent. of cases of acholuric jaundice are latent, some 90 per cent. of cases of sicklæmia, and the majority of cases of ovalocytosis. These two points emphasize a fact which is of the greatest importance. Pure hereditary diseases are uncommon in clinical medicine, but disease is very frequently the result of the interplay of environmental factors and a latent hereditary weakness.

The importance of these considerations is evident when we consider the *achlorhydric anæmias*, under which title I include pernicious anæmia, with its complication of subacute combined degeneration of the spinal cord, and simple achlorhydric anæmia. Pernicious anæmia is a disease of later life which increases in frequency in the later decades. Simple achlorhydric anæmia is a disease of women in the reproductive epoch. Yet we frequently find these maladies occurring in members of the same family, other members of which may have a symptomless achlorhydria or an achlorhydric dyspepsia unattended by anæmia. What is the explanation of these facts?

In the first place both simple achlorhydric anæmia and pernicious anæmia are essentially due to the gastric defect. The acid of the gastric juice is an important factor for the solution of the mineral elements of the food and the absorption of iron. In its absence there is a tendency to iron deficiency and anæmia of low colour index. This tendency rarely becomes manifest in males, whose blood-forming

organs are not exposed to the same strain as those of women, and who also take a diet richer in iron than their womenfolk—men are the breadwinners but the meat-eaters. In women the tendency is laid bare and gives rise to overt disease, partly from defects of diet but even more from the strain of the reproductive life, with its recurring loss of blood at the menses and its great demands on the blood-forming organs in pregnancy. Pernicious anemia is due to the absence of the gastric ferments (achylia). The work of Castle and Lucy Wills suggests that the curative hormone which is present in liver extract is normally elaborated in the stomach by the interaction of the proteolytic ferments of the juice and the vitamin B complex of the diet. Pernicious anemia is therefore in a sense a deficiency disease, and its treatment by liver a form of substitution therapy. Absence of the proteolytic ferments from the gastric juice is the most advanced degree of gastric defect, and this rarely develops until later life. These facts explain the varying incidence of simple achlorhydric anemia and pernicious anemia.

The gastric defect is the morbid hereditary trait which these diseases share in common. In my opinion an established achlorhydria is rarely present in early life in these cases, but rather a vulnerable stomach, with a poor secretory capacity. As a result of the wear and tear of digestion and the sclerosis of the gastric blood vessels in later life, the power of secretion is gradually completely lost. The phases in this process are hypochlorhydria, achlorhydria, achylia. I make this statement because I have had several patients with simple achlorhydric anemia, whose parents had died of pernicious anemia and whose children had hypochlorhydria. The following family illustration

shows the inheritance of the morbid trait. The father had pernicious anemia and died of it. The mother had hypochlorhydria and died of it. The children had hypochlorhydria and died of it.

dying of bronchitis and emphysema at the age of 77. When Mrs E was 51 her anaemia changed from the simple to the pernicious type and subacute combined degeneration of the spinal cord began to develop. She responded well to treatment first with liver and later with desiccated stomach, and at the age of 56 she lives an active life. She has achylia gastrica. Nearly a year ago she brought her sister, Mrs G, aged 40, to see me. This lady had simple achlorhydric anaemia, the Price Jones curve showing pronounced microcytosis, and she was cured by treatment with iron. Mrs G had achlorhydria with the fractional test-meal, but after injection of histamine a trace of free hydrochloric acid was found in the gastric juice. Quite recently Mrs E brought her daughter, Mrs V, aged 29, to see me on account of headaches. These were due to an error of refraction, but I took the opportunity of examining her blood, which was normal, and her gastric secretion. Mrs V had achlorhydria with the fractional test-meal, but on injection of histamine she secreted a moderate amount of free hydrochloric acid and pepsin.

So far I have been able to discuss conditions in which the constitutional factor is of paramount importance in the development of the disease. Without doubt there are other conditions in which constitution plays a part which being of smaller significance is more easily overlooked. A peculiar sex incidence of disease is always suggestive of a constitutional predisposition in the affected sex, and it is probably something of this kind which determines the preponderance of all forms of secondary anaemia in women and of leukaemia in men. Other diseases affect certain physical types—pernicious anaemia occurs in large, bulky, fair men with wide subcostal angles, polycythaemia is a disease of the lean and spare. Whatever the essential cause of aplastic anaemia and agranulocytosis, I think we shall find that in them also constitutional factors determine the vulnerability of the bone-marrow. Many thousands of individuals are exposed to the same dose of salvarsan but only in an occasional case is the bone-marrow affected.

At present we have little experience or skill in the measurement of these constitutional tendencies and only the grosser defects are uncovered. Sidelights are thrown on the problem when large numbers of individuals are exposed to the same strain and only the

susceptible break down. I have already mentioned the example of salvarsan. Another instance is the occurrence of simple achlorhydric anæmia after gastro-enterostomy. Although the operation is more often performed on men than women, post-operative microcytic anæmia is much commoner in women, almost certainly because of their sex predisposition to anæmia. A third instance is the varying speed in the regeneration of blood in transfusion donors (Jones, Widing and Nelson). Tall, wiry, robust donors stand loss of blood better than those who are of short stature or who are tall but fat. Female donors develop anæmia more quickly and recover more slowly than males, nevertheless one female donor gave 2,740 c. cm. of blood in seven transfusions within 35 days, and after the last donation her red cells were 4,220,000 per c. mm., hæmoglobin 80 per cent. Physicians of a century ago observed similar variations in the reactions of their patients to the letting of blood. Some, like the unfortunate Princess Charlotte, succumbed to the treatment, but others survived the most heroic procedures, Dr. Blundell reporting two successful cases of thoracic inflammation in each of which one and a half gallons of blood were withdrawn within five days (Goodbody).

Much may be learnt from these natural experiments, but their occurrence is casual and uncontrolled. Systematic inquiry by other channels is therefore essential. Draper has shown the value of exact measurements in the classification of disease rates, and though few of us can practise his methods in their full elaboration, we may yet use the principles and try to translate clinical impressions into concrete fact. Genius is shown not so much by the capacity for taking infinite pains as by the intuition of what things are worth painstaking work. Instead of copying Draper's work with insufficient technique and a careless, I should favour the thorough study of single

phenomena Price-Jones has shown what can be gained in this way by his studies of the variations in the size of the red cells in health and disease. Many other investigations of the same type could be carried out with great benefit to our knowledge of the limits of normality and possibly also to our knowledge of pre-disposition to disease. Quite apart from such formal investigations there is much to be learnt by carefully taking the family history and previous history of patients. The importance of heredity and constitution is not restricted to rare diseases, for it is present in common diseases like hernia, varicose veins or secondary anaemia. Disease is rarely a fortuitous blow striking its victims by the law of chance; its incidence is usually explained by their special susceptibility, and it is not the least part of our task as physicians to try and discover those weaknesses so that our patients may be forewarned and forearmed.

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# Some Aspects of Rheumatism

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MINDFUL that the proper study of mankind is man, let us consider not so much rheumatism as the rheumatic man. It is impossible to give a brief definition of rheumatism that would be adequate or that would satisfy every one; it would be bound to omit something that might be considered essential, and to contain something unnecessary or incorrect. But a composite picture of the rheumatic individual may be attempted as follows:—

He is a member of a family in which rheumatism in one or more of its many forms is already well known; he is, in his turn, liable to suffer at any time between infancy and old age from more or less striking evidences of his malign inheritance. These evidences will vary in their type at different periods of life; if he is spared the heart disease of early childhood he may fall a victim to chorea or acute arthritis during school age; in manhood he may suffer from various forms of fibrositis, and in old age he may be crippled by arthritis. During the whole of his life he bears certain characteristics which mark him off from his non-rheumatic fellows. His reaction to environment, using the term in its widest sense, is irregular and unstable. He is peculiarly vulnerable to chill and damp and may be as sensitive as a barometer to atmospheric changes. His nervous, mental and physiological functions are marked by one constant feature—instability. Overexcitable and emotional in childhood, he is afterwards a blubber to his mother and the

fatigue that they induce is the cause of schoolroom misdemeanours of inattention and forgetfulness. When he reaches adult life he is apt to alternate between bursts of excited activity and periods of listless *laissez-faire*, he is, in short, a good sprinter but a bad stayer. His digestion is never silent for long, the bilious attacks of childhood are apt to recur in milder form on slight provocation in adult life. The vagaries and perils of his cardio-vascular system are accepted by us all as one of the axioms of medicine. His respiratory organs are not immune from attack; sore throats and tonsillitis are his usual portion, a rheumatic lung-consolidation may be his fate. His skin is liable to many affections, ranging from a dry powdery eczema on the cheek of the child to the lesions of purpura or erythema nodosum or the psoriasis of osteo-arthritis. His skeletal structures are the seat of painful nodules and fibrositic hardenings in muscle, fascial sheaths and synovial membranes.

An answer to a possible criticism that this picture is overdrawn is to be found in a more detailed study of some of the lines of which it is composed. Let us consider, first, the skin, for in the view that I hope to elaborate, it is here that the clue to our whole problem is to be sought. There is universal agreement that one of the characteristic features of the acute rheumatic state is excessive sweating; less widely recognized, but just as true, is it that in the chronic rheumatic state there is also a definite anomaly of sweat secretion. In the chronic or latent form of rheumatism sweat secretion is abolished or is irregular, periods of profuse sweating breaking the sequence of sweatless weeks or months. Here we see the constant rheumatic instability of function strikingly demonstrated. It requires only a short experience of children's maladies to impress this irregularity of skin action of the rheumatic individual upon the observer's mind, many are the anxious mothers who fear that tuberculosis is the



cause of their children's night-sweats when the real cause is to be found in rheumatism.

While dryness of the skin is less likely to be complained of in the case of the child than in the adult owing to this tendency to sweat-showers in the younger patient, it is a very common item in the symptom-list of the older sufferer from rheumatism. Particularly is this so in the case of those who in early adult life have engaged in strenuous physical pursuits or who have spent years in the tropics; when for any reason such individuals curtail their physical activities or when they return to these islands they are very apt to find that the free action of the skin to which they have hitherto been accustomed fails gradually or suddenly. Shortly after this some form of chronic rheumatism attacks them and they seek advice for fibrositis or arthritis.

Closely linked with this question of sweat quantity is the controversial question of sweat quality. The "acid sweat of rheumatism" is one of the traditions that have come down to us from our distant forefathers; upon it was built the alkali therapy that preceded the introduction of salicylates. According to Wilde<sup>1</sup> the sweat of the febrile rheumatic and the heat-induced sweat of the afebrile rheumatic contains an excess of lactic acid. That lactic acid is closely connected with the development of rheumatism is a very old view, and has many points in its favour. Lactic acid certainly plays a very important part in metabolism. It is a normal product of muscle activity, and is derived from glucose or glycogen. Peters and Van Slyke<sup>2</sup> hold that in muscular activity its production is an essential preliminary to carbohydrate catabolism, it is formed by most organs as well as by muscle, but the liver and the heart tend to remove it from the bloodstream and presumably oxidize it back into a carbohydrate. Hill<sup>3</sup> has shown that a hard running effort produces as much as three grams per cent

from his muscles; it is known also that local impairment of the circulation will produce a corresponding local increase in the lactic acid content of the blood. In health this freshly-formed acid is quickly removed by elimination through the kidneys and the sweat-glands, by oxidation to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ , and to a very considerable extent by reconversion into glycogen. Whereas in the conversion of glycogen to lactic acid oxygen is not needed, a supply of oxygen is essential to the reconversion of the acid into glycogen.

Wilde's observations were hampered by imperfect technique; using litmus paper as an indicator he claimed that the sweat of a rheumatic was always acid—an observation that we now know to be only partly true. He claimed also that the acidity which he found so constantly was due to lactic acid—a claim which it is not possible now to substantiate. His view was based upon the use of Uffelmann's reagent as a test for lactic acid, this is unreliable in the presence of other acids, such as are to be found in the secretion of the skin. Wilde's simple views aroused much criticism, and unfortunately the weight of such criticism has tended to smother much of the truth which may yet be found to lie hidden in the ideas which he held. Prominent among his critics was Pemberton<sup>4</sup> in America, who contradicted the lactic acid in sweat view *in toto*. As one who had convinced himself of the value of the treatment that Wilde had devised I felt that it was of urgent importance that the truth or otherwise of his chemical views should be reinvestigated. To this end Dr. Boyd has been working upon this problem for the last two years in the laboratory of the Dreadnought Hospital; her results are as yet unpublished, but she allows me to quote some of her findings:—

Investigating first the  $\text{pH}$  value, she finds that there is no essential difference between the sweats of normal and rheumatic individuals. The value varies as Talbert<sup>5</sup> has shown in different parts of the body, that of the leg being more acid than that of the arm or chest. The figures vary between 5.9 and 7.2 with an average

of 6.6. There is a slight variation between the pH readings of the sweat at the beginning and the end of a period of sweating. Investigating the lactic acid content of the sweat, using the technique of Friedmann, Cotomo and Schaffer, Boyd found that whereas the figure for non-rheumatic controls was 123 mgm per 100 c.c.m., that for rheumatic patients was 125.6.

Turning now to another aspect of the skin, its vascular supply calls for consideration. Sensitiveness to chill and patchy coldness of the surface of the body or its extremities are very common findings in the rheumatic state. The surface thermometer may record a lowered temperature in the skin over a draught-induced stiff neck or lumbago; when the whole body is heated by artificial measures or by a fever this area may still "feel cold" to the patient. There is some objective evidence of capillary narrowing and blood stasis in the skin when it is examined under the surface microscope, and this point has also been investigated by Pemberton,<sup>6</sup> in an ingenious way:—

He points out that if in taking a sample of blood for a blood count nothing is done to alter the surface circulation, such as rubbing or the use of a constricting band, the first drop of blood which flows from a needle puncture will be a sample from the capillaries, and, if the blood continues to flow, later drops will give samples from the arteries. If there is a difference between the red cell count in the first drop and the fourth drop, some capillary stasis may be assumed. Over a series of counts, using precisely similar technique, he investigated this matter and found that whereas in normal subjects the cell count of the first drop was less than that of the fourth drop by 11 per cent., in arthritis such a difference was found in 44 per cent.

Observations such as these confirm the view that in rheumatic individuals there is an abnormality of the skin circulation. Less tangible, but probably of considerable importance, is the role played by the nerve endings of the skin in originating afferent impulses by which bodily functions such as the control of blood-pressure may be maintained or endocrine glands may be affected indirectly.

It is not next to the nervous feature of the rheumatic state which comes before the mind: this is, however, the case. It is simply that it is impossible to deal

with it except as one of the major nervous phenomena—major in dramatic intensity but perhaps of no greater importance from our present point of view than some of the relatively minor nervous phenomena that are more common. Among these, fatigue must be given an important place; all are familiar with the tired, listless child who is sleepy in the morning, inattentive at school, and whose whole bearing is, for those with eyes to see, a prayer for sleep. Almost as common are the weariness and depression of the adult who is the subject of chronic rheumatic troubles, for him or her, apart altogether from the effects of pain and possibly disturbed nights, there is apt to be an outlook on life characterized by weariness and lack of mental and physical energy. Under appropriate treatment this is eminently curable and its relief may long precede the cure of pain. At the other end of the scale from the tired child we find the keen, intelligent youngster who is rather too quick in the uptake, who dreams about his lessons and rushes off to school, where he gains the approval of his masters for his industry and of his school-mates for his vivacity; sooner or later, helped not infrequently by pressure for a scholarship, the crash comes in a burst of chorea or he drifts into the mentally tired young adult, without initiative and without energy. Such temperamental phenomena are very suggestive of endocrine instability.

In the field of the ductless glands it is easy to indulge in flights of fancy and we must be careful to keep our feet on solid ground. Applying our critical faculties, let us consider rheumatism in relation to inaction or over-action of the ductless glands. It is fair to say that of these the thyroid is the master, not only are its functions best understood but it stands alone in the ease with which its functions if inefficient can be replaced by substitution therapy. It exerts some control at least upon all the other ductless glands. Next to it in these particulars comes the suprarenal, including

the chromaffin tissue scattered elsewhere in the body. It is possible to correlate in theory many of the features of the rheumatic state with established effect of altered functions of these two glands. The lethargy of the child, the fatigue of the adult, their impaired circulation and lowered body temperature, have their counterpart in myxœdema. The flushed face and over-activity of the choreic, the irregular sweating, rapid pulse and nervous excitability of other rheumatic children are mirrored in Graves' disease.

Other points call for notice: the tendency for adiposity to develop in the child who has had chorea, the occasional coincidence of Graves' disease and frank rheumatism, the instability of vascular control shown in the varying blood-pressure of the thyroid patient, that can be compared to the pressure fluctuations of the child who faints easily, the altered sugar metabolism of the rheumatic comparable to that of thyroid anomaly. Llewellyn's study of this question has revealed the close similarity that exists between the maps of the geographical distribution of thyroid disease and of rheumatism. Still further points that might be mentioned here are the frequent commencement of rheumatic troubles after pregnancy and particularly after lactation, when the ductless glands have passed through an exhausting period. It would be interesting to know whether anyone has seen acute rheumatic fever coinciding with pregnancy; is it not a fact, rather, that pregnancy seems to exert a temporary curative influence upon rheumatic diseases?

In a recent paper by Llewellyn and Bassett Jones<sup>2</sup> an important hypothesis is advanced which, if confirmed, as appears likely, will go far to correlate the factor of skin and endocrines in rheumatism. They point out that thyroxin and adrenalin are derivatives of a common precursor, tyrosin,<sup>3</sup> and that this compound is distributed in the horny non-vascular layer of the skin. Associated with the

tyrosin in the skin is cystin. Cystin is a constituent of all protein and active tissues of the body; it is indispensable to life, and is the most essential of all sulphur compounds found in the body; it is probably the source of the sulphur-containing factor of insulin and from it is derived cystin, which is a factor of extreme importance in promoting oxidation and reduction of protein and amino-acids in the tissues. If, therefore, the natural storehouse of the mother-substance of thyroxin and adrenaline is imperfectly filled, exhausted by disease or excessive calls, or if the lymph channels by which it sends supplies to the circulation are stagnant, endocrine anomalies are bound to occur. May it not be that in study of this question of tyrosin-supply from the skin may be found the clue to many of our problems?

The importance of infection has, in my opinion, been very grossly exaggerated; it is not the cause of rheumatism, and any influence that it may exert is slight and indirect. Having erected such a large target with what some will regard as intolerant and intolerable dogmatism, let me give some of the reasons for the disbelief that is in me. Thirty years ago Poynton and Paine published their claim that the acute manifestations of rheumatism were due to infection with a specific organism; investigators in every country have concentrated upon this aspect of the problem ever since. Among them there is still no agreement as to which organism is responsible, but there is agreement that in rheumatism cultures from appropriate sources on appropriate media should yield a growth of streptococci, failure is to be ascribed to improper technique. Cecil,<sup>10</sup> working on infective arthritis, has stated that three weeks' primary culture of 20 c cm of blood is necessary; a period and an amount which may explain many previous failures.

There is, however, no consensus of opinion as to the exact nature of the streptococcus responsible; many forms with different appearances, different habits

of growth and different reaction to environment have been found. To quote Cecil, "Environmental differences may induce biologic variation in these streptococci, not only *in vitro* but *in vivo*," a sentence which seems to throw the onus of rheumatism back where it belongs—the environmental provision afforded to organisms by the tissues of their host

Homer Swift<sup>8</sup> holds that hypersensitiveness to streptococci is a factor in the pathogenesis of rheumatic fever. He says: "So far as our present experience with immunization indicates, if the symptom complex known as rheumatic fever is due to streptococci, a number of different strains and types are responsible, for highly sensitized animals give hyperergic inflammatory responses, not only to the homologous strain used for sensitization, but also to strains of streptococci that are immunologically and culturally unrelated." He describes his attempts to immunize animals with intravenous injections of strepto-hæmo vaccine, and states that most hypersensitive animals can be rendered immensely hyposensitive by suitable intravenous vaccination. But he also states that "We recognize that in most cases of rheumatic fever the tendency is towards recovery of varying degrees of permanence." Miller and Smith,<sup>9</sup> working on the streptococcal content of the bowel in 250 arthritic patients, were able to isolate streptococci from the faeces of 92 per cent, but were able in cases of other disease to do the same in 85 per cent. In their experience a marked preponderance of streptococci (80 per cent of all colonies) found in chronic arthritis is only slightly more marked than in other diseases.

In face of such results from workers of repute we are forced to conclude that no specific organism can be the cause of rheumatism, in view of the work that has already been done in vain. It is unlikely that further search will reveal any such organism. It is possible that some of the non-specific causes of rheumatism may be

explained, as Homer Swift holds, by allergy to the products of streptococci; such a view offers a possible common ground to those who resent the wrenching of the sceptre from the streptococcus and those who are jealous for the majesty of metabolism.

Sensitivity of the body and its tissues is governed by the ductless glands, for instance, the hypersensitiveness of the asthmatic can be controlled by adrenaline; similarly an effusion into a joint in the course of acute rheumatism can be removed by a hypodermic injection of adrenaline. Metabolic integrity may be disturbed by many agencies, of which chronic sepsis may be one. Restoration of full health while a pool of sepsis exists in a maxillary antrum, a tonsillar bed or a tooth-socket is not to be expected. Common sense demands that such hindrances to recovery must be eliminated, but the cases in which such spring-cleaning will alone suffice to effect a cure are few.

If the conception that metabolic error is at the root of the manifestations of rheumatism is correct it is obvious that cure is not to be expected as the result of the administration of drugs. This is not to say that drugs are of no value; such a statement in view of universal experience would be absurd, but it is necessary to realize that their action is merely palliative and never curative. When, as in the case of salicylates, their dramatic effect upon temperature and pain is taken as evidence of cure they become a danger. Who among us has not seen their use followed by relapse and recurrence in a short time? Who has ever been able to convince himself that salicylates have ever abated the tachycardia of juvenile rheumatism or prevented the development of a disturbance of rhythm or an endocarditis? So strongly do these considerations weigh with me that it has for several years been my practice to withhold salicylates from my patients suffering from acute rheumatism and to treat them by purely physical measures designed to overcome some



obtained is 3 to 4 degrees, higher in the subacute case, lower in the very chronic. Under hospital conditions I have repeatedly kept patients in the bath for 1½ to 2 hours. Such long exposures have very striking results, and a rise of temperature to 107° or 108° F. may be obtained; it is surprising that such fever can occur without distress. The rise is gradual till suddenly the high peak occurs; there is at the same time a slight rise in the pulse rate, but to a figure that does not approach the rate which might be expected. On removal of the patient from the bath the temperature and pulse fall rapidly.

It is interesting to contrast this induced hyperpyrexia with the natural rheumatic hyperpyrexia occasionally seen; the latter is always dangerous and often fatal. One striking difference is that whereas in the induced form sweating is profuse, in the natural form it is abolished. This seems to afford still another instance of the importance of the skin functions in rheumatic disorders and to lend additional support to the view that correction of the faults that underlie rheumatism is to be sought not in drugs, not in vaccines, but in the use of physical methods designed to establish or re-establish complete skin health.

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# Recent Developments in Immunotherapy

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THE THERAPEUTIC immunization is of two kinds: "active," bacteria or their products being introduced into the body with the expectation of evoking a state of resistance comparable to that following spontaneous infection, and "passive," which involves the use of a serum containing already formed those substances by which it is believed that infection is resisted or overcome. Each of these methods is subdivisible, the former according to whether the material used contains actually living bacteria, dead bacteria, or bacterial products; the latter according to the nature and mode of action of the specific substance in the serum. Some examples of these methods are familiar, others have by no means yet received the general recognition which they deserve. It may therefore be useful to review some of the newer methods, classifying them under the headings already indicated.

## ACTIVE IMMUNIZATION

(1) *By means of living bacteria.*—There can be no question that when it is possible to practise immunization by this method, the state of immunity which results is superior to that obtainable by any other. This is to be expected, since the proceeding is the nearest approach to an actual attack of the disease. It is only feasible when the capacity of a micro-organism for multiplying in the body can be greatly diminished, this change can sometimes be effected by exposing it to unusual or unfavourable conditions, whether *in vivo* or *in vitro*. Habituation to a different animal host is an example of the former method, and

is the basis of two important and reliable methods of immunization: vaccination against small-pox is inoculation with living small-pox virus which has lost its capacity for producing this disease in the human being by repeated transference among calves, and the prophylactic treatment of rabies depends on the use of living rabies virus reduced in its capacity for attacking man and dogs by passage in rabbits, although here attenuation is secured further by drying the rabbits' spinal cords in which the virus is contained. Among ordinary bacteria, attenuation results from prolonged artificial cultivation, from cultivation in media which, while still permitting growth, contain some inimical substance, and from cultivation under abnormal physical conditions, such as high temperature or pressure; such treatment has been applied in the past to produce living, but nevertheless safe, vaccines for immunizing against anthrax, cholera and typhoid fever.

There is a comparatively new example of this method which has enormous possibilities, although it is still too early to judge whether they will be fulfilled. BCG (Beauve-Calmette-Guérin) is a strain of the tubercle bacillus which has been grown since 1908 on a medium containing bile, and has consequently lost much of its capacity for producing disease. Even the common pig, in which inoculation with the virulent numbers of ordinary tubercle bacilli followed by a progressive and fatal infection, can withstand inoculation with it, a lesser results which is circumscript, and the animal recovers.

The practice advocated by Calmette is the administration of these doses of living bacilli by the mouth to new-born calves the first ten days after birth; pigs are vaccinated at birth by placing the bacilli in the teats of the sow, the first three being absorbed in a sufficient lymphoid tissue to produce a permanent effect. If the vaccine is not absorbed, the calf or pig will be vaccinated again at the end of a few days. The results are

the bacilli are said to be more readily removed from the bowel during the first fortnight of life, and (2) inoculation, to be effective, must precede natural infection. The treatment has now been applied to upwards of 100,000 infants in France, mainly those born in tuberculous families and therefore exposed to infection at an early age. This is naturally a method of which the results can only be assessed after the lapse of years, and then only with difficulty. From the statistical point of view, Calmette's results to date are said to be unconvincing. From the theoretical standpoint the method is open to two serious objections: (a) that an unmeasurable dose is being given, since the degree of absorption from the bowel and the extent of subsequent multiplication of the bacilli are beyond control, and (b) that the organism itself may be capable of regaining virulence; this aspect of the subject has recently been reviewed by Dreyer.<sup>2</sup>

Nevertheless, the fact remains that living tubercle bacilli have been administered to hosts of children with at all events few untoward results, and that this proceeding should theoretically secure some degree of immunity. There is certainly at present no more hopeful method of dealing with a disease which has defied forty years of varied efforts at specific therapy. It is not to be forgotten that the immunization of children is only one of two uses to which this method may be put. If it be granted that resistance to tuberculous infection can be increased by means of B.C.G., even were the risks of effective dosage too great to justify its use in infants, there remains the important possibility of immunizing calves, among which a small mortality would constitute a less serious objection. The unsatisfactory state of the milk supply in this country and the amount of disease in childhood attributable to this cause have recently been discussed in this journal by Moynihan.<sup>3</sup> There is therefore no need to recapitulate the facts, nor would it be profitable to discuss the merits of pasteurization as a remedy, beyond

saying that tubercle bacilli in "pasteurized" milk are by no means always dead. Viewed from whatever standpoint, the prevalence of tuberculosis in cattle is a grave danger, and if inoculation of calves with B.C.G. can free the dairy herds of this country from tuberculosis, the achievement will be second in importance only to the successful immunization of children themselves.

There are no other established uses for living bacterial vaccines; the method has potentialities of danger which have discouraged its application. It is nevertheless tempting to speculate on the possibilities of treating resistant chronic inflammatory conditions by this method, such, for instance, as long-standing nasal infections due to bacteria which in many cases have little general invasive power, and would therefore not be expected, especially if attenuated, to give rise to any progressive lesion if injected into the subcutaneous tissues. This is a field which remains almost wholly unexplored.

(2) *By means of killed bacteria*.—In the use of ordinary bacterial vaccines, the position remains much as it has been for many years. Reasonably effective prophylaxis can be assured against certain specific infections, such as enteric fever. The comparative uncertainty of prophylaxis for colds and influenza is no doubt largely due to the multiplicity of bacteria concerned, many of which may be represented inadequately or not at all in the vaccine used. If we accept the proposition that some, at least, of the infections are due to a virus, failure is hardly surprising. Therefore, however, one quite specific infection in which preventive inoculation deserves a wider application, at least until its value can be better appreciated, on the appearance of whooping-cough in a family or a school, the remaining children may be treated with a B. pertussis vaccine with a better expectation of success than the severity of the disease

should they contract it. This is a conservative statement in comparison with those of French writers (Pierret),<sup>1</sup> who claim absolute prevention following prophylactic administration and amelioration even if the vaccine be given during the course of the established disease. The discrepancy between these and certain English results, possibly attributable to differences in technique, require that the method should be more fully investigated.

(3) *By means of bacterial products.*—Substances produced from bacteria in a great variety of ways have been used for the purpose of immunization. The method among all these which rests on a sure foundation is the use of soluble toxins. In considering infections from an immunological standpoint a sharp distinction must be drawn between those due to bacteria which produce such a toxin and those which do not or which, at all events, have not so far been shown to do so. In the former, the condition is a toxæmia in the true sense: a demonstrable toxin is produced which is carried to distant parts of the body, whereas the bacteria forming it remain strictly localized in a lesion which in itself may be comparatively trifling; of this type of infection, tetanus is, perhaps, the best example. The outcome of infections of this type depends immediately not so much on any capacity to deal with the bacteria themselves as on the formation or supply of the antitoxin which will neutralize their toxin. Similarly, preventive immunization must consist in administering not bacteria, but toxin.

It would doubtless be possible to immunize by this method against any of these infections, but tetanus, botulism, gas gangrene and Shiga dysentery are not conditions against which it is usually worth while to secure anticipatory protection. There remain, however, diphtheria and scarlet fever, the former the earliest and most extensively studied of these true toxæmias, the latter admitted to this category only

pentive weapon, the capabilities of which are accurately measurable. Of the use of these serums in diphtheria, tetanus and some other infections, there is little new that need be said. A rather different and more debatable position exists in connection with the use of scarlet fever antitoxin. We know now that scarlet fever is a streptococcal infection, that the rash is due to the formation of a toxin, that this toxin can be manufactured *in vitro*, can be used for a susceptibility test and for prophylactic immunization just as in the case of diphtheria, and when injected into animals produces an antitoxin. That this antitoxin furnishes appropriate treatment for scarlet fever there is no doubt, but it is being used extensively for the treatment of severe streptococcal infections of other kinds, and its applicability to these is a matter of some difficulty and interest. The "unitarian" view of the streptococci recently advocated by Okell<sup>6</sup> in a comprehensive review of the part played by these organisms in human disease, regards the hæmolytic streptococci as essentially one race, of which different members vary in their capacity to produce certain effects. Thus, the streptococcus in a case of scarlet fever is one which produces enough of the "erythrogenic" toxin to cause the rash characteristic of that disease; in septic infection elsewhere, the invasive and pyogenic activities of the organism predominate, although the red lymphatics sometimes seen in lymphangitis may be taken as evidence that the erythrogenic toxin is also being produced. Scarlet fever antitoxin can do no more than neutralize this one toxin, but assuming that this is produced at least in some amount by all hæmolytic streptococci, its neutralization may just serve to turn the scales in the patient's favour. That life is saved by the antitoxin and the infection be-lieved to be sterile is a supposition which has been suggested by Price and Okell.<sup>7</sup> A preliminary trial of this antitoxin in a case of erysipelas associated

by Okell for distinguishing those cases in which antitoxin cannot be expected to help (i.e. giving a negative result) from those which it may benefit.

It should be added that *Staphylococcus aureus* is now known to produce an exotoxin, and that the antitoxin treatment of severe staphylococcal infections is in the experimental stage, it is too early yet to assess its results.

*Anti-bacterial serums.*—These are serums containing or supposed to contain antibodies which act on bacteria themselves. In contrast with antitoxic serums their activity is singularly difficult to estimate, whether experimentally or clinically. The anti-streptococcal serum, to be distinguished clearly from scarlet fever antitoxin (one being prepared by immunizing animals with the organism, the other with its toxin), which was formerly much used in the treatment of streptococcal infections, is an example. Convincing evidence of the efficacy of many of these serums is lacking, and their mode of action is often obscure. In cerebrospinal fever we have one disease which is clearly amenable to treatment with an efficient serum of this type, and it is possible that pneumonia will prove to be another example when the Felton concentrated serum has been more fully evaluated. With this possible exception, no new anti-bacterial serums of certain efficacy have recently been produced.

*Convalescent human serums*—A new method having far-reaching possibilities was brought to light when Nicolle and Conseil showed in 1916 that measles in a susceptible subject exposed to infection could be prevented by the injection of serum from a recently-recovered case. Debré, seven years later, was responsible for the observation that when given at a later stage, the effect of the serum was to diminish the severity of the attack. This proceeding he christened "sero-attenuation," and in healthy patients it is preferable to complete protection in that the ensuing



immunity to diphtheria and scarlet fever. The injection of serum from recovered human cases can be used at will either to prevent or to attenuate an attack of measles, and possibly to modify the course of other infections.

Although these methods can be applied on a large scale only by the action of public health authorities, their employment in individual cases or in small communities remains to a large extent the duty of the individual practitioner, who may find in them the means of performing valuable service.

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# Silico-Anthracosis

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SILICO-ANTHRACOSIS is an occupational pneumoconiosis which affects workers in coal mines. Anthracosis was the name suggested by Stratton<sup>1</sup> in 1838 to define the black fibrotic lung of coal miners. There can be no misconception of what Stratton and the early writers meant by anthracosis. To them, the term implied a fibrosis of the lung, which was black and solid in parts, due to the inhalation of mine dust. It was a definite disease, the results of which were described by Thackrah<sup>2</sup> in 1832, when he told of the dearth of coal miners more than 50 years of age. "Colliers," he stated, "do not generally exceed the age of 50." Ventilation in mines was unheard of, or, at least in those days not practised to any extent. A few years later ventilation was closely studied and the air in mines so much improved that cases of gross anthracosis became fewer and fewer until, at the beginning of the twentieth century, the original meaning of the definition seems to have been entirely forgotten. "Anthracosis" at this period was used to indicate the patchy dark colour of the lungs seen in town dwellers, and mere pigmentation of the lungs by soot, prussian blue, or vermilion in animal experiments appertaining to the port of entry of the tubercle bacillus. Experiments show that the lungs of animals free themselves from coal dust very rapidly, and Mavrogordato<sup>3</sup> suggests that coal dust may even neutralize the harmful effects of silica. "These experiments," he states, "have certainly left the impression that the lungs practically free themselves from 'flue' or 'crystalline silica' dust, if these dusts enter in small quantities and with coal."

In the Lancashire coalfield there is a well-marked

pancreas are frequently seen.

*Histology.*—The microscopical story is illustrated by Figures 2, 3, 4, 5, 6, and 7. Fig. 2 shows the early formation of a silico-anthracoctic nodule. The perivascular lymphatic block and resulting fibrosis with the piling up of dust cells, the thickened inter-alveolar septa laden with dust cells, and dilated alveoli are seen. Fibrosis advances and areas coalesce with the formation of dense whorled nodules composed of fibrous tissue entrapped in which are dust cells. Fig. 3



FIG. 2. This photomicrograph shows the early stage of fibrosis. Blood vessels with thickened inter-alveolar septa are seen at 1, and a more dense than at 2 is then a tissue with dense alveoli. At 3 the dilated alveolus is seen, laden with dust cells and with dilated alveoli.

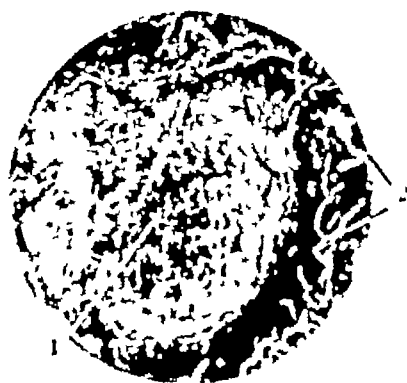


FIG. 3. This is a later stage of the process shown in Fig. 2. A dense area of dust cells at 1 and at 2 is dilated alveolus.

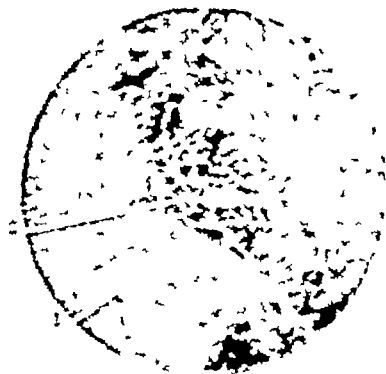


FIG. 4. At this stage the dense area of dust cells is more extensive than in Fig. 3. The dilated alveolus is still present.

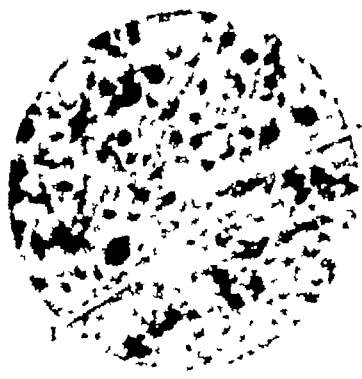


FIG. 5. This is a later stage of the process shown in Fig. 4. The dense area of dust cells is more extensive than in Fig. 4. The dilated alveolus is still present.

—These nodules are not non-vascular. Dilated small vessels are seen around the nodule in the figure and capillaries are present amongst the fibrous tissue. The fibrous tissue may undergo hyaline degeneration and be transformed into structureless bands. Vessels inside the nodule may rupture (Fig. 4), with the result that a cavity is formed filled with red blood cells, fragments of fibrous tissue and dust cells. Fig. 5 is taken from the edge of the cavity shown in Fig. 1, and illustrates a ruptured capillary with red corpuscles and dust cells lying free amongst the fibrous tissue. By extension of the hæmorrhage adjacent areas are involved and large cavities produced. Fig. 6 shows an interesting condition seen in the great majority of these cases. Islets

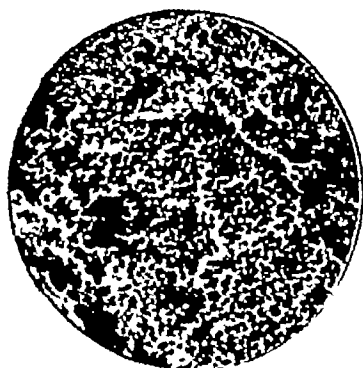


FIG 6—This photomicrograph shows an aggregation of lymphocytes embedded in a mass of fibrous tissue and dust cells

of lymphocytes are found in places where normally no lymphocytic tissue exists. This mass of lymphocytes is situated amongst fibrous tissue and dust cells, and aggregations are found immediately beneath the pleura. Not uncommonly lymphocytes are arranged around blood vessels resembling the perivascular cuff surrounding the cerebral vessels in encephalitis lethargica. Plasma cells, endothelial cells and fibroblasts in all stages of development are seen in the sections.

*Curious bodies.*—In addition to the enormous amount of amorphous black granular dust, a feature of some sections is the presence of numbers of large black

angular particles measuring up to 85 or more micra in length. Some of these particles have a golden yellow material deposited around them, and the more slender spicules present the single or double bulbous ends and annular arrangement of the deposit so constantly seen in asbestosis (Fig. 7). These bodies are readily obtained by the trypsinization of a portion of

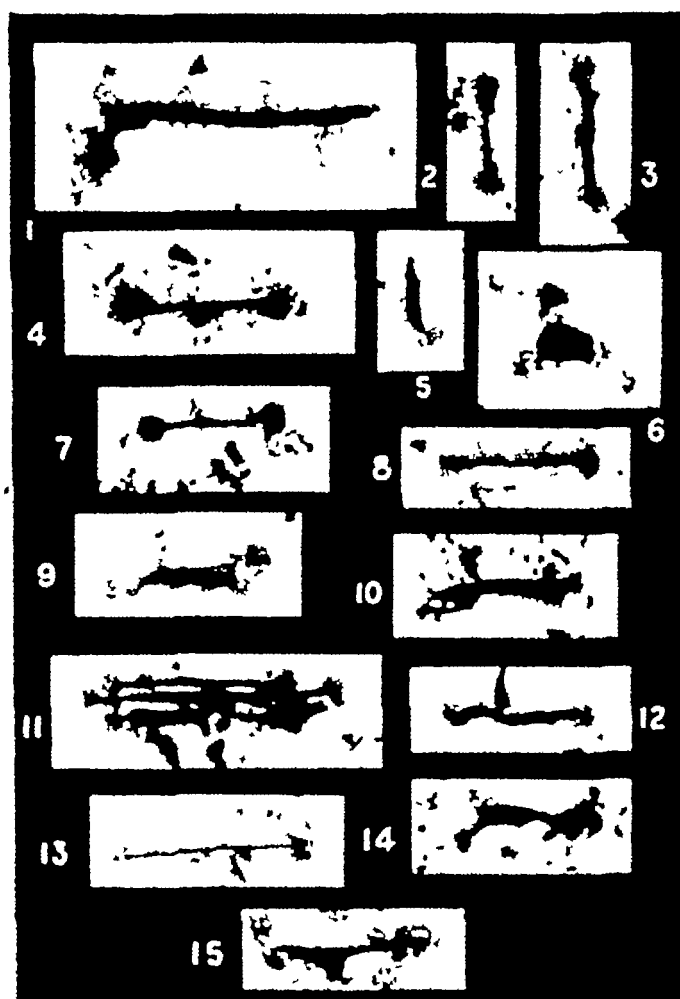


FIG. 7. The 15 illustrate the various forms of asbestos bodies found in a case of asbestosis. The most prominent of the spicules forming the bulk of the bodies are: (1) 87  $\mu$ , (2) 57  $\mu$ , (3) 57  $\mu$ , (4) 50  $\mu$ , (5) 22  $\mu$ , (6) 17  $\mu$ , (7) 12  $\mu$ , (8) 12  $\mu$ , (9) 42  $\mu$ , (10) 92  $\mu$ , (11) 10  $\mu$ , (12) 10  $\mu$ , (13) 27  $\mu$ , (14) 44  $\mu$ , (15) 37  $\mu$ . (1) A double beaded body from a case of asbestosis. The fibers are stained in aluminum citrate and cleared in cedar oil for comparison. The length of the bodies is 47  $\mu$ . (Reprinted by permission of C. F. Hull and W. L. Cooke.)

the lung. The golden yellow colloidal deposit may be due to the interaction between colloidal silica and blood proteins and adsorption by the foreign bodies.

*Examination by polarized light*—Sections and the mineral deposit after trypsinization show by polarized light innumerable fine and coarse doubly refractile granules of silica. The numbers vary in different sections and in different parts of the same section, but they are present no matter from what part of the lung the section is taken.

*Chemical analysis*.—Analyses of a large number of lungs in cases of anthracosis show that the silica content is consistently abnormally high. There does not, however, seem to be a direct relation between the extent of anthracotic consolidation and the amount of silica present. For example, the analysis in a case<sup>23</sup> in which there was generalized fibrosis and a few small nodules in each lung field, but not gross consolidation, showed the presence of 40.2 per cent. of silica in the lung ash. Analysis of the lungs in which there were very large solid areas, portions of which are seen in the photographs in Fig. 1, showed the silica content to be 44.9 per cent. of the lung ash. One would not have expected the lung in the first case to contain such a large percentage of silica.

Cummins and Sladden's figures show that not only is the silica content high in cases of miners dying from anthracosis, but that it is also high in miners not known to have any pulmonary disability. Their figures in anthracosis are comparable to and in some cases even higher than those given by McCrae<sup>29</sup> in quartz miners in South Africa, namely, 39.7 per cent. of silica in the lung ash. Cummins and Sladden's highest figure was 42.1 per cent., and Dr. Archer's analysis of the case illustrated here shows 44.9 per cent. of silica.

#### CLINICAL FEATURES

*Period of development*.—As in other forms of silicosis

there is a considerable period between the commencement of work and the onset of symptoms in anthracosis. The factors upon which the length of the latent period depends are the presence and degree of concentration of silica dust and the ventilation of the mine. The present day conditions in our coal mines are not comparable to those of the time of Thackrah; the latent period at that time could have been but a few years, 5 or 10 at the most, for death to take place before the age of 50. Under modern conditions of mining the latent period is difficult to estimate, but would appear to have the wide range of 15 to 30 years.

*Types*—Cases of silico-anthracosis may be classified as of three types. The first type does not complain of any pulmonary symptoms and does not exhibit any gross physical signs of lung disease, but, on radiological examination, the hilum shadow is wider than normal, there is definite fibrosis in the lung fields, and a few scattered nodules or small consolidated areas are seen. After death from accident or other disease the bronchial glands are found to be enlarged, black and hard, the pleura thickened and adherent in places, and there are small isolated areas of anthracotic consolidation. It is a matter of surprise that fairly extensive anthracosis may exist without any complaint and with an efficient working life. There are, however, many pointers. Dyspnoea on slight exertion, emphysema, Lombard's varicose zone marked and dilatation of the veins on the chest wall at the level of the diaphragmatic attachment are suggestive features.

In the second type, the moderately advanced case, the outstanding symptoms and physical signs are those of emphysema with fibrosis. There is dyspnoea on slight exertion and perhaps cyanosis, a deficient chest movement with prolonged expiration and areas of decreased resonance. The sputum is small in amount, tenacious and black, remains black for months and even years after cessation of work, and consists of mucus,

a few polynuclear leucocytes and many mononuclear cells packed with dust particles. Clubbing of the finger tips is usual, and pulmonary osteo-arthropathy in as marked a degree as the cases described by Marie<sup>30</sup> is occasionally seen. In these, in addition to clubbing of the fingers, the lower ends of the radius and ulna and tibia and fibula are enlarged and prominent. Pleural thickening and adhesions are more marked, and the areas of consolidation larger and more definite clinically than in the first type. Pleural effusion, bronchiectasis and cavitation may occur.

The third type, or advanced case, presents all the features of the second in an accentuated form. Dyspnoea is more pronounced and even statical. The areas of consolidation are larger. The greater part of the upper lobes and apices of the lower lobes, or one or both bases, may be the chief seats of consolidation with smaller areas in other parts of both lungs. There is increase in the interscapular dullness and in the dullness over the consolidated areas with diminished or absent breath sounds. The accompanying emphysema may obliterate all other signs. Or, there may be bronchial or amphoric breathing, depending, of course, on the relationship of bronchi to the solid masses and cavitation. The physical signs over the rest of the chest are those of emphysema, which is always present. Oedema of the legs and the usual signs of cardiac failure may be present. Oedema of the thoracic wall with dilatation of the veins and oedema of the arms may simulate thoracic neoplasm. The course of the disease in pure anthracosis is apyrexial, but at any stage infective processes—lung abscess, septic bronchitis, empyema or tuberculosis—may supervene and dominate the clinical picture to the exclusion of the primary condition.

*The blood.*—The blood picture is not characteristic, but there are several points of importance. The red cells are sometimes increased in numbers, and counts



of 6,500,000 to 7,500,000 per c.mm. are occasionally found. This should be remembered, because increase in the red cells has been suggested as evidence of chronic carbon monoxide poisoning. Later in the disease there is a secondary anaemia of a non-regenerative type. A toxic secondary anaemia accompanies infection. The monocytes are not increased in numbers, nor is the polynuclear count so deflected as in tuberculous lesions of the same extent. Eosinophiles may number 5 to 7 per cent. of the total leucocytes, but usually are not increased. The sedimentation rate, bleeding time, coagulation time, and available calcium tests are normal.

*Radiographical appearances.*—Unfortunately radiologists are not yet agreed upon standard methods in chest work and still less are they agreed upon the interpretation of lung shadows. Silico-anthracosis gives many and varied pictures and is frequently diagnosed as chronic fibroid phthisis, chronic pneumonia, etc. Osler's<sup>31</sup> remarks on their deficiencies in tuberculosis are emphasized in the diagnosis of coalminers' lung: "More than any others, radiographers need the salutary lessons of the deadhouse to correct their visionary interpretation of shadows, particularly of those radiating from the roots of the lungs." The unsatisfactory position to-day is due to lack of co-operation between physician, pathologist, chemist, and radiologist, and must be remedied.

#### DIAGNOSIS

The history, knowledge of the working conditions, and the presence of emphysema with dyspnoea altogether out of proportion to the amount of exercise, black morning sputum with minimal physical signs in the chest and the presence of fibrosis by X-ray examination are the important points.

#### PROGNOSIS

As can well be imagined the change in the lungs

are unalterable, but if a diagnosis is made in the early stages and the patient removed from the mine and given an outdoor occupation the disease appears not only to be arrested but considerable improvement in the lung condition and cardiac response takes place. Even the moderately advanced cases live many years in tolerable comfort. Infective conditions such as purulent bronchitis increase the gravity of the case. Patients with any degree of silico-anthracosis rapidly succumb to influenza and lobar pneumonia.

#### PROPHYLAXIS

There is still much room for improvement in the preventive measures against dust in our coal mines. Better ventilation, especially in "dead-end" places and cuttings, the universal adoption of wet drilling or direct exhausts to drills, and in special circumstances the use of respirators would materially lessen the incidence of anthracosis.

#### TREATMENT

The essentials are the removal of the patient from mine dust and to guard against infection in the already damaged lung. The teeth, naso-pharynx, tonsils, intestines and urine should be investigated with the view of elimination of any septic focus. Bronchitis is the chief danger, and the patient's life should be regulated with this in mind. Avoidance of chill is important. In the winter months woollen under-clothing, woollen socks, and waterproof boots should be worn. In foggy weather and at other times if catarrhal colds are prevalent, a few drops of the following inhalant, suggested by Dr Joseph Jones of Leigh, should be sprinkled on the handkerchief or respirator and intermittently inhaled through the nose.—

R	Menthol	-	-	-	-	-	-	gr	xxx
	Thymol	-	-	-	-	-	-	gr	x
	Ol lavandulæ	-	-	-	-	-	-	℥	xx

Oil cajuputi . . . . .	m. x
Isopropyl alcohol ad . . . . .	℥ss
Solve, et adde liq ammon fort . . . . .	m. x

The distressing morning cough with viscid sputum is relieved by a warm alkaline draught such as:—

R Sod bicarb . . . . .	gr xx
Sod citrat . . . . .	gr xx
Sod chlor . . . . .	gr x
Aq menth pip ad . . . . .	℥ss

a tablespoonful in half a tumblerful of warm water on rising

The per-sistent irritating cough is checked by some form of codeine, and the following prescription seems to act as well as any:—

R Acid citric . . . . .	gr x
Tinct camph co . . . . .	℥i xx
Syr codeinæ . . . . .	℥i xxx
Syr scillæ . . . . .	℥i xxx
Syr pruni virg . . . . .	℥i
Aq aneth ad . . . . .	℥i

The spasmodic dyspnoea—colliers' asthma—requires grindeha, stramonium, belladonna or other anti-spasmodic and in certain cases adrenaline. Felsol powders are sometimes helpful. Cardiac failure with cyanosis, urgent dyspnoea, dilated right heart, etc., calls for energetic measures. Venesection is practised far too little. The removal of 15 to 20 ounces of blood often gives dramatic relief. Digitalis is indicated and oxygen plus 5 per cent  $\text{CO}_2$  given through a nasal catheter 10 or 15 minutes every hour is beneficial.

Diet is important. Potatoes and puppy carbohydrate foods are common causes of respiratory distress and should be replaced by toast and dry biscuit. Laminaceous puddings and any other article known to give discomfort should be omitted from the dietary. The amount of exercise must be regulated according to the response in each particular case. Any exertion which causes signs of distress must be forbidden. Anaemia is not uncommon, but may be avoided by careful regimen. Vaccine therapy has a

definite niche in treatment if chronic naso-pharyngeal catarrh or purulent bronchitis is present, and cases of spasmodic dyspnoea find relief from injections of dilute peptone solution.

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# The Etiology of Miners' Nystagmus

By W. J. ROCHE, M.B., M.Ch., B.A.O. D.O., D.O.M.S.,  
D.L.O.

I HAVE been investigating miners' nystagmus and its causation for the past six years. My previous efforts have been confined to the incidence of the disease in men not incapacitated, underground illumination, and the amount of light reflected from various coal seams. The present investigation is much more thorough; I have endeavoured to study and compare all underground conditions in eight different pits; these are three steam coal pits, two dry steam-coal pits, two house coal pits, and one mixed house-coal and steam-coal pit. The three steam-coal pits were chosen because they had a very high percentage of cases on compensation for nystagmus. The two dry steam-coal pits were chosen because they had a very low percentage of cases on compensation, the two house coal pits because nystagmus is practically unknown in these pits, and the mixed house- and steam coal pit because they have not had a case on compensation for seven years. To estimate the percentage of nystagmus cases at each colliery, I examined a fair percentage of the men working on the day and night shifts. The following chart (page 509) gives the results of my research work in the various collieries. It will be noted in the chart that the highest percentage of cases occur in steam coal pits A, B and C, which are also the deepest pit and the least humid. I may say that the barometric pressure varies 1 inch for every 984 feet in depth. They also show the highest percentages of methane present.

The most outstanding point is the small percentage of light reflected from the coal faces of steam coal pits.

A, B and C; the amounts are 17.3, 13.7, and 14.2, respectively. In house coal pit B it must be admitted that the amount of light reflected is only 13.8 per cent., but this is more than counteracted by the fact that in this pit acetylene lamps with a candle power varying from 10 to 20 are used; whereas in the steam-coal pits electric lamps of 1-candle power and oil lamps of 0.5 candle power are used.

#### METHODS OF INVESTIGATION

As photometers are not permitted underground owing to the danger of explosions, the following original method was devised for measuring the amount of light reflected from coal faces

The figures expressed for the illumination of the coal face are expressed as a percentage of the total illumination which would be possible if coal were a perfect reflector giving a 100 per cent. reflection. The reflected light was measured by allowing the light thrown from the coal face to fall upon sensitized paper placed at a definite and fixed distance from the coal during an accurate and standard time exposure. The lighting of the coal face was effected by means of a 4-volt Oldham standard miners' lamp placed next the paper but so arranged and screened that no direct rays from the lamp could fall on the sensitized paper. To ensure uniformity of the paper only that of the same make and also the same batch number was used.

The paper after being exposed for 30 seconds (the standard exposure adopted for each test) was developed, using an amidol developer, great attention was given to the details of development, i.e. temperature of the solution, time of immersion in the developer, and also for each batch of tests a fresh and accurate solution was made. After developing, the depth of tint obtained was compared with a range of standard shades (grey colour intensities) specially prepared, and checked by means of photometric observations, each shade representing a different percentage of light reflection ranging from  $4\frac{1}{2}$  per cent. to 43 per cent. In the early stages a large number of duplicate tests were made and no difficulty was experienced in obtaining a very close agreement. Gas samples were taken 100 yards from the face in the air intake, at the face, and in the return air 100 yards from the face. Temperatures, humidity and velocity of air were taken at the coal faces. Velocity of air at most pit bottoms is about 1,000 feet per minute.

It has been asserted by some observers that carbon monoxide is a cause of miners' nystagmus; carbon monoxide was not detected in any of the pits, although



the test was sensitive to one part in three millions. Of those men receiving compensation 68 per cent. were working on the day shift, 20·7 per cent. on the night shift, and 11·3 per cent. on the afternoon shift; also over a period of ten years more men claimed compensation in the winter months of the year than in the summer months. These figures also favour the theory that poor illumination is the principal causation: (1) For six months of the year, the day workers are in the daylight for about two hours each day, during four of these months they practically only see daylight at week-ends. (2) The underground worker uses his peripheral vision entirely. During the good light months he is suddenly transported on leaving the cage into brilliant daylight; this shock to his oculomotor and retinal nervous system must be very great.

In the mixed steam- and house-coal pit until 1925 there were 167 cases on compensation over a period of 10 years, 90 per cent. of these cases occurred on the day shift. A covered-in passage about 40 yards in length badly lighted with daylight was erected at the pit top, all the men had to walk along this passage on the way to the lamp room, as a result, the change from peripheral to central vision was gradual. Since the erection of this passage seven years ago there have been no new cases claiming compensation. In the dry steam-coal pit B the men ascend the pit by the upcast shaft, which is enclosed. The men have to pass through a fair-sized room which is badly lit with daylight; the incidence of nystagmus in this colliery is practically nil (1·82 per cent.)

I do not think that faulty position of the body owing to narrow seams is a partial causation of this disease; but men who are suffering from nystagmus work in great discomfort in thin seams, owing to the vertigo produced by bending. Collers (coal hewers) who are working though affected with nystagmus show the highest incidence, 57 per cent.; the next highest



percentages occur amongst firemen (examiners), hauliers, repairers and chargemen. It is significant that all these men do detailed form work, and hence the amount of ocular nervous energy wasted owing to working in bad light must be very great.

I consider that the symptom of this disease which favours defective illumination as being the major causation is twilight blindness, which is one of the earliest symptoms and one which occurs in every case of the disease. The worker in bad light can only use his peripheral vision, consequently the periphery of the retina becomes fatigued. Nature never intended the worker to do 7½ hours form work, and the symptom of twilight blindness shows that he must be fatigued. In house-coal pits this disease rarely occurs; the candle power of the lamps used is at least 10-candle power and the worker consequently uses his central vision. In steam-coal pits owing to the presence of gases acetylene lamps are not permitted; the usual illumination is the 1-candle power electric lamp and the 0.5 candle power oil lamp. These lamps have only half these respective candle powers at the end of a shift. Considering that in the average pit 80 per cent. or more of the light is absorbed by the coal face, and that the worker is dependent on the 20 per cent. or less of the light which is reflected to perform his work, the use of central vision with these lamps is impossible.

It is a strange coincidence that the deeper pits have the largest number of cases; the only difference which depth makes is the alteration in atmospheric pressure. If atmospheric pressure is a cause of this disease, one would expect to find myasthenia in gold and diamond mines, which are much deeper, yet, it does not occur in the mines. A prominent physiologist informs me that the amount of methane present in the pits examined is not toxic, and could not be associated with this disease. It might be argued that the disease rarely occurs in house-coal pits, where

methane and other gases are absent, but, because of the absence of gases in these pits, open acetylene lights are permitted and as a result the illumination is excellent. It is probable that much dust is an accessory cause, because much of the workers' light is absorbed by the dust before falling on the coal face.

It was hoped that when the 1-candle power lamp was introduced that this disease would diminish considerably, yet it has increased. This is easily explained; the increase in candle power over the oil safety lamp is only  $\frac{1}{2}$ -candle power and towards the end of the shift the candle power of the electric lamp is little better than that of the oil lamp, but there is 200 times more glare with the plain glass electric lamp than with the oil lamp. I am confident that the annoyance of glare is one of the principal reasons why sufferers from this disease cease work, and it is also probably a contributory factor in the causation of the disease. One of the principal symptoms of the disease is the seeming movements of lights owing to the presence of oscillations. When a man is going to and returning from his work underground, an average distance of about  $1\frac{1}{2}$  miles, he has to follow a queue of men carrying swinging lamps; the glare of the electric lamps, and their seeming movements, provoke marked headache and vertigo; the psychical effects of these discomforts urge a man to cease work and claim compensation. This annoyance could be entirely dispensed with if a shade were attached to the back of each lamp going to and returning from work; this shade would have the additional advantage of acting as a reflector and the roadway would be better lighted and also dark adaptation would be more gradual. I have found out, by experiment on colleagues and myself, that there is less glare with a 4-candle power lamp with frosted prismatic glass, which has a slight green tint, than with the 1-candle power plain glass electric lamp. In the latter the bright filament is

seen, but not in the former, also the prismatic glass causes diffusion and obliquity of the light rays, and the green tint absorbs the irritating rays.

### CONCLUSIONS

Both this investigation, and my previous research work during the past six years<sup>1,2</sup>, point to the fact that insufficient illumination underground is the major causation of this disease; dust owing to its absorption of light is a secondary cause. Men who are intemperate, in poor health or of nervous disposition, are most likely to be affected. The harder the worker the more liable is he to be affected with the disease. The disease is insidious, and few cases occur under nine years of working underground. The average age of those whom I found affected was 44.5 years; I have known a few cases where it has occurred in boys aged 17 years.

### RECOMMENDATIONS

We know that the underground worker who uses a lamp of 1-candle power or less must use his peripheral vision; it is absolutely essential that those tradesmen doing form work should use their central vision. The amount of light which the worker would require is directly dependant upon the amount of light reflected from the coal face, because it is with the reflected light that he performs his work.

In the pits investigated it will be noted that the amount of reflected light from the coal varied from 15.9 per cent in the pit with the highest percentage of nyctagmus cases (41-43 per cent) to 25.4 per cent in a pit with only a few nyctagmus cases (1-88 per cent). The candle power required to create macular vision in the two pits would be entirely different. We know that the borderline between photopic and scotopic vision corresponds to a field of brightness of about 0.0073 millilambert, from that the necessary calculation can be made. It is probable that the

worker has his lamp at a distance of 4 feet from the coal face, lamps with a candle power of roughly 4 and 2.5 respectively would be required for these respective pits.

(1) The ideal lamp is the cap lamp; it is 6-candle power or more and the worker has always a constant amount of illumination as his lamp is with him wherever he goes

(2) The next best lamp is the 4-candle power hand lamp with frosted prismatic glass with a slight green tint.

(3) Plain glass electric lamps should not be permitted underground owing to the marked glare; they should be fitted with a similar glass to that in the 4-candle power lamp.

(4) Shades should be worn on the back of all lamps going to and returning from the coal face, they will protect those following from glare and will also act as reflectors. As a result the roadways will be better illuminated and dark adaptation will be more gradual.

(5) White-washing walls, timbers and arches assists illumination considerably owing to the excellent reflection produced.

(6) Flood illumination should be used where possible.

(7) There should be a covered-in passage on the way from the cage to the lamp room so that men would be gradually light-adapted on ascending from the pit.

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# Plantar Warts and their Treatment

By JOHN L. FRANKLIN, M.A., M.B., M.R.C.P.

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WARTS may occur on any part of the body, but when they affect the soles of the feet they are accompanied by appearances and symptoms that are worthy of special consideration. Plantar warts occur at any age, but are more frequent in young people. Both sexes are affected equally. Their cause is obscure, but they are probably of infective origin, and the fact that their incidence appears to be on the increase and that they are especially common among school-children and athletes who walk barefoot and in crowded dressing-rooms, lends colour to this hypothesis.

The morbid changes of plantar warts differ only slightly from those of warts in other situations. There is an overgrowth of the prickle-cell layer and prolongation of the interpapillary processes, together with pronounced hyperkeratosis. The corium under the growth is stretched and flattened. Whereas warts in other situations protrude above the surface, plantar warts, by reason of the continual pressure exerted upon them, are pushed into the skin so that the mass of new growth lies in a little cavity produced by itself. Plantar warts may occur on any part of the sole, but principally affect the balls of the toes, the metatarsal pads and the heels. They are usually round or oval in outline and are level with, or just raised above, the under surface of the foot. They are grey in colour and usually sharply demarcated from the surrounding skin. They can be easily felt as hard tumours. Usually there are several present

The chief symptom of a plantar wart is pain upon pressure, and this may be so severe as to give the patient a limping gait.

Plantar warts must be distinguished from corns or callosities, which are diffuse in outline, consist of layer upon layer of thick yellow keratinized material, are formed at points of pressure, and are mainly caused by ill-fitting shoes. They are usually found at the sides of the feet and on the tops of the toes. Corns may be removed by paring them down with a sharp knife. This cannot be done with plantar warts, any attempt at cutting being accompanied by severe bleeding.

#### TREATMENT

Plantar warts are not amenable to psychological treatment as is claimed to be the case with warts in other situations. Internal medical treatment is of no benefit. Several methods of local treatment are available, all of which have their devotees. Some require great experience and elaborate apparatus, while others are simple enough to be practised by men living in the most remote localities. Whatever method is selected it is essential to remove all traces of the tumour since, if any be left, regrowth will occur.

*Caustics.*—Owing to their situation, plantar warts are not suitable for treatment with caustics such as trichloroacetic acid, nitric acid or pure carbolic.

*Excision*—This is a very bad method of dealing with the condition. It requires very deep cutting and the use of stitches and is altogether unnecessary.

*Radium*—This is one of the best methods of all, but for obvious reasons is not within the reach of every case. A ten milligramme plaque is placed over the wart and left in position for from two to four hours, according to the size and depth of the growth. After a week or ten days the wart becomes soft and macerated and separates, leaving a clean dry cavity which rapidly heals, requiring the application of mild

antiseptics for a few days only.

*X-Rays.*—In some hands X-rays are almost as effective as the application of radium, and the after-effects are similar. Various methods have been tried. Probably the best is the administration of a full pastille dose, using a 1 mm. aluminium filter. Great care must be taken to shield the surrounding skin from the rays. This is best effected by exposing the wart through a hole cut to its exact size in a piece of thick lead rubber. A curious fact is that after treatment with radium or X-rays the pain of plantar warts disappears within a few hours.

*Carbon dioxide snow.*—Plantar warts may be frozen with carbon dioxide snow. The solid stick, the diameter of which should exceed that of the tumour by about a quarter of an inch, is pressed firmly against the growth for two or three minutes. The wart may be softened first by the application of a hot fomentation for about an hour before treatment or the application of 25 per cent. salicylic acid plaster some twenty-four hours before. Twelve to twenty-four hours after freezing a blister forms and, if treatment is successful, the wart will be found adherent to the roof of the blister. This is cut away and the cavity is filled with pulv. bismuthi subgallatis or packed with cyanide gauze. This treatment is by no means certain and often has to be repeated.

*Electrolysis.*—This has been tried in the treatment of plantar warts, the growth being transfixed with a zinc needle connected up with the positive pole of a galvanic battery and a current of from 2-5 milli amperes passed for several minutes. This is repeated, the growth being transfixed in different directions several times. This treatment is not to be recommended owing to the difficulty in determining when the wart has been completely destroyed.

*Cryosurgery.*—In the writer's opinion this is far and away the best method of treating plantar warts. If

a great many are present a general anæsthetic must be administered, but up to three or four may be removed under local anæsthesia. The sole of the foot is carefully cleaned with spirit and a cubic centimetre of 4 per cent. novocaine with a drop of adrenaline is injected into the base of each wart. The prick of the needle in this situation is often very painful and this may be mitigated to some extent by freezing the spot with ethyl chloride spray before inserting the needle. Anæsthesia is complete in four or five minutes. The wart is then scraped out completely with a sharp Volkmann's spoon. If the wart is quite a small one a better instrument is the small curette used by ophthalmic surgeons for scraping out Meibomian cysts. There should not be any difficulty in this procedure as the curette has no effect upon the surrounding normal tissue, and in most cases the wart will shell out in one solid mass. Care must be taken to remove all traces of warty material, otherwise there will be a recurrence. Profuse bleeding generally follows the operation, but this is readily stopped by going over the base of the cavity with the dull red point of the galvanocautery. The part is then painted with iodine and a simple dressing applied. If a cautery is not available firm pressure with a pad and bandage for ten to fifteen minutes will usually stop all bleeding. After the operation patients are able to walk about at once. After-treatment consists in dressing the cavity daily with white precipitate ointment until it heals; this usually takes a little over a week. Very occasionally, when the effects of the local anæsthetic have worn off, the patient experiences acute pain in the treated part, which lasts for about an hour. This can be prevented to a large extent by dressing the wound immediately after operation with an ointment consisting of 5 per cent. stovaine in vaseline.





who have been accurately followed, in 82 patients complete and satisfactory cure was obtained. In 7 other patients slight toxicity is still present, entirely controlled by either secondary operation or compound solution of iodine. In three patients of the group myxedema developed, this was entirely controlled by desiccated thyroid. Four of the patients in the group are still toxic. None of the 4 is in any way incapacitated, and all are working. One of the patients in the group died following a recent secondary operation for recurrent hyperthyroidism and congestive heart failure. It is, therefore, the authors' belief that 92, or 94.8 per cent of these 97 patients are cured of their disease by subtotal thyroidectomy, and that this figure may be assumed to be a fair estimate of the probability of cure of exophthalmic goitre by adequate surgical measures—(*Journal of the American Medical Association*, August 20, 1932, xcix, 612.)

### *The Treatment of Acute Narcotic Poisoning*

E. Leschke, in a series of articles he is contributing to the *Munchener medizinische Wochenschrift* on recent advances in the recognition and treatment of the more important types of poisoning, draws attention to the large place occupied by the barbiturates among hypnotics at the present day. And in consequence, these drugs, which act on the brain stem, are being increasingly used for suicidal purposes—in place of the older chloral hydrate, amylenehydrate and paraldehyde. The signs of poisoning by hypnotics are those of deep narcosis—coma, absence of reflexes, muscular flaccidity, fall of blood-pressure—the fall in diastolic pressure being a prodromal sign. The state of the pupils varies: in veronal poisoning they are, as a rule, contracted, but with many other agents they are expanded, while, with all hypnotics, as the condition advances they cease to react. In slight cases the face becomes red and swollen, due to vascular dilatation, while the blood-pressure is maintained, but as paralysis of the vasomotor centres sets in cyanosis, lividity and pallor supervene. The respiratory centre is at first stimulated, then depressed. Death occurs through narcosis of the medulla oblongata, with respiratory and vasomotor paralysis, or, in subacute cases, through pulmonary oedema or fatty degeneration of the kidneys. The treatment of acute hypnotic poisoning demands thorough lavage of the stomach, followed by the introduction of a suspension of medicinal charcoal in water. If the jaw is fixed a nasal tube must be passed. With regard to stimulants, these should be given in large doses, and all analeptics available should be used in rotation. This is one condition, Leschke emphasizes, when polypharmacy is justified. The analeptics recommended are coramine, caffeine, cardiazol and strychnine. The most effective measure, however, is the intrathecal injection of 2 c cm. of ordinary camphor oil solution (10 per cent), although latterly considerable attention has been drawn to the value of coramine. One ampoule of 5.5 c cm. of a 25 per cent solution of coramine is injected intravenously, and a second ampoule is injected intramuscularly half to one hour later. The cerebro spinal fluid is usually under raised pressure, therefore lumbar puncture should be performed, and the fluid allowed to



family practitioner who is generally summoned for abdominal pain and on him rests the responsibility and the satisfaction of early diagnosis, and on his alertness depends whether a diseased appendix is removed before complications have occurred. Confirmation of the diagnosis and support of the surgeon should, if possible, be awaited until the patient has reached the hospital, rather than incurring further delay at the patient's home. The patient can be prepared and necessary laboratory examinations made if the surgeon is not at once available —(*New England Journal of Medicine*, August 25, 1932, cccvii, 311)

### *The Treatment of Whooping Cough with Mustard Packs*

Ludwig Veilchenblau holds that there is one common principle underlying all the various methods of treatment which are recommended in whooping cough. Apart from the use of sedatives, the effect of which is merely symptomatic, this principle, in his opinion, is stimulation of the skin, which in turn raises the general powers of resistance of the body. The value of the antipyretics, e.g. quinine, in this disease lies therefore in their dermatropic action, evidence of this action is furnished by their effect in causing sweating and, if pushed, various exanthemata. Similarly, vaccination and whooping cough serum have a dermatropic effect of increasing the skin resistance. This principle is also involved in Ponndorf's vaccine. If these various agents are effective in whooping cough owing to this dermatropic action, then that agent which causes most marked stimulation of the skin will give the best results. On these premises the author therefore recommends the application of mustard packs to the chest, abdomen and back, supplemented by hot baths. He first observed the effectiveness of this treatment in a case of pneumonia complicated by whooping cough. The packs were prescribed for the pneumonia, and the whooping cough also rapidly cleared up. In uncomplicated whooping cough, where the child is up and about, he endeavours to persuade the parents to keep the patient in bed, and mustard packs are applied over the body for twenty minutes twice daily, followed by a hot bath and sweating in blankets for an hour. Under this treatment vomiting usually ceased on the third or fourth day, and in a few days the coughing spasms became less frequent. From the eleventh day onwards, further treatment was, as a rule, unnecessary. In conclusion, he remarks that the difficulty is to persuade the parents that the child must be kept in bed and that nursing is necessary, but he found that the rapid improvement in the child's condition after a couple of days soon ensured willing collaboration —(*Münchener medizinische Wochenschrift*, August 26, 1932, 1402)

## Reviews of Books

*Infusional Pneumothorax* By L. S. T. Burrell, M.D., F.R.C.P.  
Practitioner Series London: William Heinemann (Medical  
Books), Ltd., 1932 Pp. vii and 174 Figs. 13, Radiograms 16  
Price 12s. 6d.

THIS is a clearly-written guide for the general practitioner and comes with the authority of a recognized expert possessing wide experience of what is one of the great advances in the treatment of pulmonary tuberculosis. In his series of 671 cases of artificial pneumothorax, 580 were pulmonary tuberculosis, and of the remaining 91 cases bronchiectasis heads the list with 28, followed by 18 for diagnostic purposes, and 16 for abscess of the lung. In the chapter on surgical methods accounts are given of Jacobaeus' plan of finding adhesions with a thoracoscope, and dividing them with a galvanocautery, of phrenic evulsion, and thoracoplasty, the indications for these methods and their contra-indications are, of course, mentioned, and it is pointed out that the effects of phrenic evulsion and thoracoplasty are permanent and cannot be "undone," as can be attained in artificial pneumothorax by merely ceasing to give refills. The radiograms, mainly showing the chest before and after the induction of artificial pneumothorax, for which the author is indebted to Dr. Stanley Melville, are admirably reproduced. This volume is the second to appear in the new "Practitioner Series," which is being brought out by William Heinemann (Medical Books), and should attract many readers by its contents, quite apart from the name of the series for which, naturally, we feel there is much to be said.

*Recent Advances in Obstetrics and Gynecology*. By ARTHUR W. BURNETT, M.A., M.B., B.Ch., F.R.C.S., F.C.O.G., and LESLIE H. WILLIAMS, M.D., M.S., F.R.C.S., M.C.O.G. Hard Editors. Recent Advances Series. London: J. & A. Churchill, 1952. Pp. x and 418. Illustrations, 87. Price 12.6d.

The first thing that I noticed when I stepped out of the car was a cold, biting wind. It was a relief, after the warm, stuffy air of the car. I walked towards the entrance of the building, my hands in my pockets. The building was a large, imposing structure with many windows. I saw a sign that said "Medical Research Center". I walked in, and a man in a white coat stopped me. He asked me my name and what I was there for. I told him my name and that I was a student. He then led me to a room where I was to wait. I sat down on a bench and looked out the window. The view was of a large, open field with some trees in the distance. I felt a sense of peace and calm. I had found a place where I could think and work without any distractions. I was happy to be here.

the last, and the profession in maternal mortality, and this makes of special value the four chapters on "Antenatal care," "Maternal mortality," "Causes of fetal death," and "Puerperal sepsis," while another publicly discussed subject is well reviewed in the chapter on "Anæsthesia and analgesia in obstetrics." On the scientific side, the most recent work in obstetrics has been in bio chemistry and its relation to the toxæmias, and this is well reviewed in two chapters upon "The chemistry of the blood and urine in pregnancy" and "Toxæmia of pregnancy." On the purely clinical side "Antepartum hæmorrhage" and "Cæsarean section" are dealt with, and an interesting appendix upon "Kielland's forceps" by Dr Kielland himself. In gynecology, the choice of subjects must have presented greater difficulty, and the authors have shown great wisdom in their choice. Cancer of the cervix, sterility, prolapse, endometrioma, hæmorrhage, hormones, physio therapy, and X-rays are all subjects with a vast literature and definite advances of knowledge, and therefore of interest to all practising this branch of medicine. The authors are to be congratulated upon the way they have completed their task of compressing into one small volume the results of so much reading, and of presenting the work in such a readable manner, while the illustrations are well chosen. This is a volume which will not only be of increased interest and usefulness to the general practitioner, but must be read by everyone specially interested in this branch of medicine.

*A Shorter Surgery* By R. J. McNeill Love, M.B., M.S., F.R.C.S.  
Third edition London H. K. Lewis & Co., Ltd., 1932  
Pp 403 Illustrations 96 Price 16s

THE publication of the third edition of this popular book marks the expression of its value. The necessary increase in size is fully recompensed by the additional material available in the text. It provides a valuable collection of detail without the usual padding, containing an inclusive summary of present-day surgical practice, describing comprehensive treatment, together with details of the more recently adopted methods of investigation. The text is extraordinarily clear throughout, being particularly commendable in respect of the difficulties overcome in subjects, such as deformities and the guiding principles in spinal and cranial lesions. In parts, further qualification of assertions might prove advantageous, as in the statement that the hydrochloric content of gastric juice is normally 20 to 40, the description of rectal diseases dismisses fistula somewhat hastily, considering the difficulties met with in the treatment, the prognosis of cases of carcinoma of the rectum treated by perineal excision is somewhat gloomily painted, whilst the complication of pyelophlebitis following septic thrombosis of hæmorrhoids must be a rare occurrence. The description of diseases of the breast might be modified, particularly in respect of such conditions as Paget's disease, in which a less conservative view might be expressed in view of the opinions held by many. The chapters dealing with genito-urinary diseases give an inclusive description of recent methods of investigation, some points, however, might be

modified in intravenous urography with the new preparations admirable radiograms are obtainable five minutes after injection, the recommendation of indigo-carmin in a strength of 4 per cent surely should read as 0.4 per cent, and the frequency of carcinomatous changes in apparently ordinary hypertrophied prostates is higher than stated according to the views of many surgeons, being more in the region of 12 per cent, as compared with 2. Tuberculin as a means of treatment in tuberculosis of the genito-urinary system is not mentioned, though one of the preparations is still recommended by surgeons. In general, the volume should be an asset in the hands of all students, especially as a handbook in the earlier years of study, and is a convenient form of rapid revision for the senior student and practitioner.

*Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes.* By HUGH MACLEOD, M.D., D.Sc., F.R.C.P.  
Fifth Edition. London: Constable and Co., 1932. Pp. xi and 219. Figs. 10. Charts 11. Price 12s.

It is now ten years since this popular volume, the first to appear in the *Modern Medical Monograph* series, edited by the author, appeared, and about its success there cannot be any doubt. The publishers' note to this new edition points out that additions have been made, particularly with regard to sugar tolerance, the effects of obesity and starvation, and to the use of insulin in malnutrition due to conditions other than diabetes. From the excellent results obtained by the use of insulin it might be anticipated that the death rate from diabetes would have fallen, but as far as statistics go this is not the case, the age incidence, however, has shifted and the majority of diabetic deaths occur in old people, among whom severe diabetes is rare and simple glycosuria is common; it is therefore probable that the deaths attributed to diabetes are really due to other causes in patients with simple glycosuria. Further, insulin is often not merely useful, but essential in the treatment of coma in the elderly as it is in the young, the former are usually old, debilitated and infected by coma and liable to die from a cardiac failure. As dogs from which the pancreas has been completely removed cannot be kept alive by insulin alone, it is not unlikely that the same is true of man, and that many of the deaths formerly attributed to diabetes are really due to cardiac failure.

*The Pathology of Sex and Intersexual Conditions.* By GORDON H. MANNING. Translated from the Spanish by WALTER B. WELLS, with an afterword by the author. London: George Allen and Unwin, 1932. Pp. 244. Price 15s.

THE HON. J. H. MACLEOD, Professor of Pathology in the University of Victoria and Director of the Institute of Pathology of the Medical College of British Columbia, has been translated from the Spanish edition of this book into English by Walter B. Wells, M.D., a member of the American Association of Anatomists, and the author of a valuable work on the

conclusion that sex is not an individual attribute with an immutable value, but, as the author expresses it, sex is comparable with age except that the evolution of sex does not follow an absolutely uniform rhythm. The author adheres to the concept of bisexuality; and his attitude can perhaps best be expressed by the dictum that "the masculine and the feminine are not two diametrically opposed entities, but successive degrees in the development of a single function—sex." Thus, in the woman there is after adolescence a long period of feminine maturity, followed in turn by a short viriloid phase, sketchy and belated, which ends with old age. The infantile period in the man is followed by a seminoid phase, rudimentary and short, succeeded by a long virile period, well differentiated, which is prolonged into old age. The pure male and female types are stated to be rare, and human beings showing a mingling of the masculine and feminine characteristics are said to manifest inter-sexuality, and classified into various groups from the perfect hermaphrodite with ovo-testes to a single sexual characteristic, for example a woman with masculine hirsutism, or a man with a woman's voice. Homosexuality, which is an intersexual condition, is considered in some detail, and a chapter is devoted to critical inter-sexuality, namely, the manifestations occurring at puberty, the feminoid changes and adiposity of some boys, and at the climacteric, the viriloid morphology and even psychology in woman. The influence of the non-sexual endocrine glands is discussed with authority, attention being drawn to the virilogenic action of the suprarenal cortex and the anterior lobe of the pituitary. In the last chapter the prospect of promoting sexual differentiation, and the benefit that may possibly be obtained by grafting operations, and pituitary, thyroid and other endocrine preparations are carefully considered.

*The Diabetic A B C A Practical Book for Patients and Nurses* By R. D. LAWRENCE, M.D., F.R.C.P. Second edition. London. H. K. Lewis & Co., 1932. Pp. vii and 56. Price 3s. 6d.

THE success of this work, dedicated to "My Fellow Diabetics" by the Physician-in-Charge of the Diabetic Department at King's College Hospital, and author of the *Diabetic Life* is shown by its having been already reprinted twice since it came out in 1929. In this new edition some changes have been made, especially in an increase in the amount of carbohydrate, which further experience has rendered advisable, in the Lane Ration scheme. As before, it is clearly written in simple language, and thoroughly practical.

*Health Services for East Sussex*. Lewes. Issued by the East Sussex Rural Community Council, 1932. Pp. 99. Price 1s.

THE object of this handbook is to supply information to those who wish (1) to obtain assistance for someone in ill-health, or (2) to help in any way the hard-worked health organizations in the county. It succeeds in the not very easy task of giving simple and clear information to lay readers and of reminding the medical profession, in a concise and easily accessible form, of the facilities available and of the addresses of the responsible officials.



# Notes and Preparations

## THE MORRIS FILM EXHIBITION

To introduce their 1933 programme, Messrs Morris Motors, Ltd (Cowley, Oxford), organised a film exhibition at the Phoenix Theatre, London, on September 8th. The most interesting film was one showing trial runs of the new Morris ten, which went off the beaten track into some of the most beautiful parts of England. Another film showed one round the Morris works at Cowley, a wonderful demonstration of modern mass production methods. Other films showed the new Morris models being put through their paces. The most novel item in the 1933 programme is the new flashing traffic direction indicator, which is being fitted as standard to all the Morris range except the Minor. It takes the form of a set of three coloured lights fitted on the scuttle on both sides of the car and readily visible from both front and rear. The lights are controlled from a simple switch fitted close to the driver's hand on the dash-board. Signals to traffic and to policemen can be clearly given and clearly seen, and road safety increased accordingly. It seems to us to be a real advance in the direction of 'safety first'. Other improvements in the 1933 models are the 4 speed gear box with twin top silent third, and the new mudguards with fendershields on the front wings, which not only have a better appearance but protect the cars from mud splashes.

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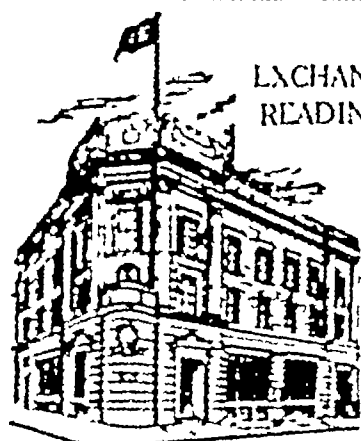
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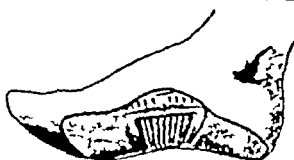
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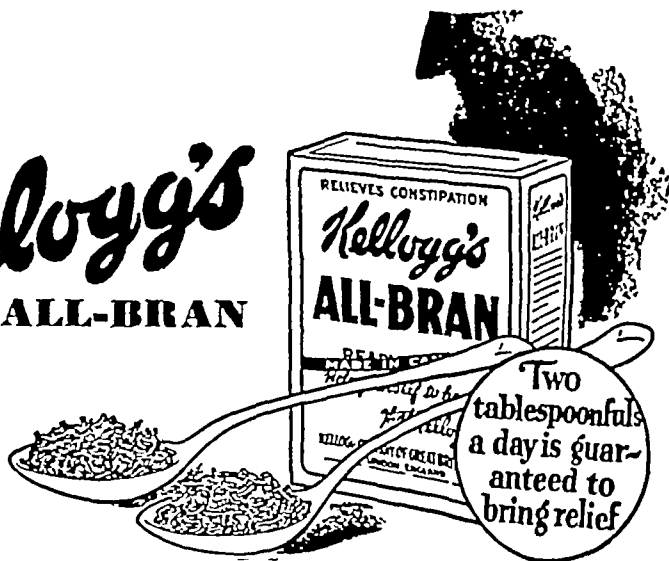
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PHARMACEUTICAL PREPARATIONS, &c.—	—	Chloroform, &c.	—	Salt, &c.	—

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- (2) Rents (Upsala University) "Some investigations into the Pharmacological Properties of Chlorophyll"
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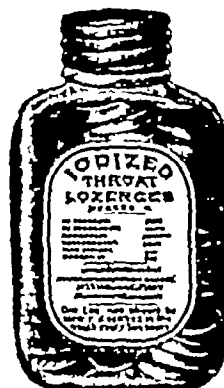
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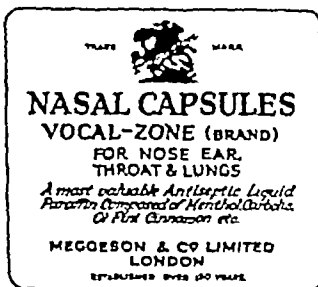
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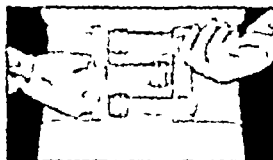
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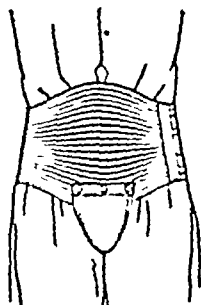


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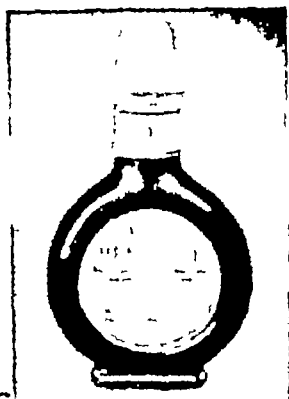
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Magnified view of cellulose filter (contained in the filter tip) BEFORE SMOKING

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From  
"The Practitioner's"  
report

May, 1931

p 584

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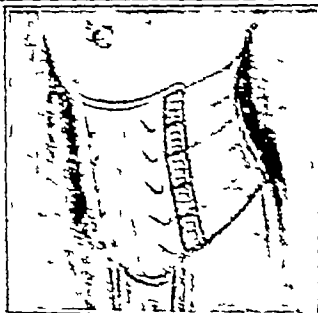
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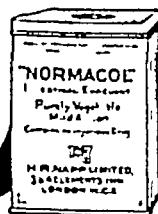
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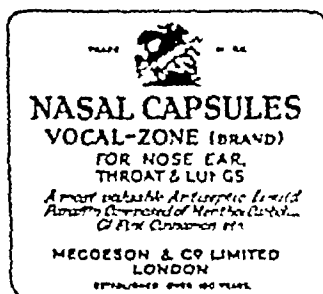
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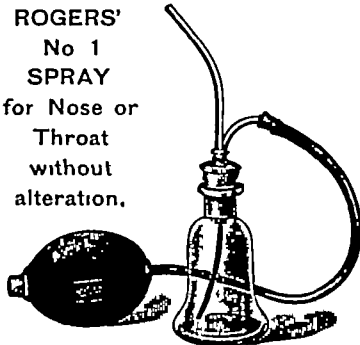
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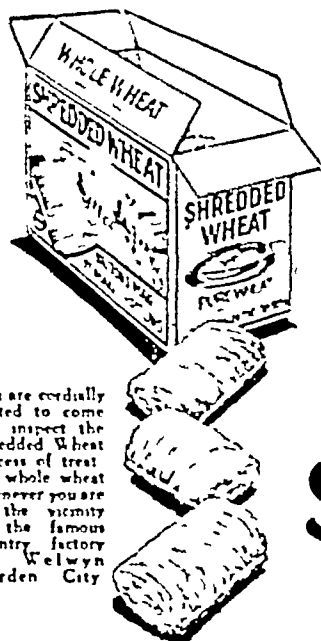
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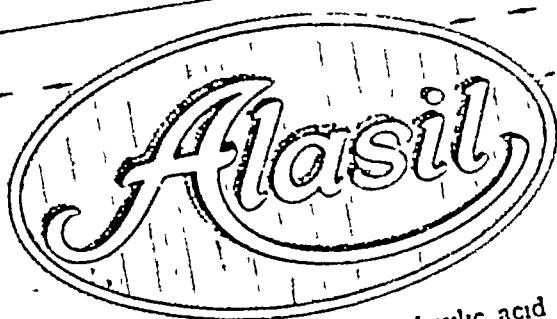
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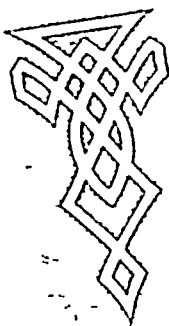
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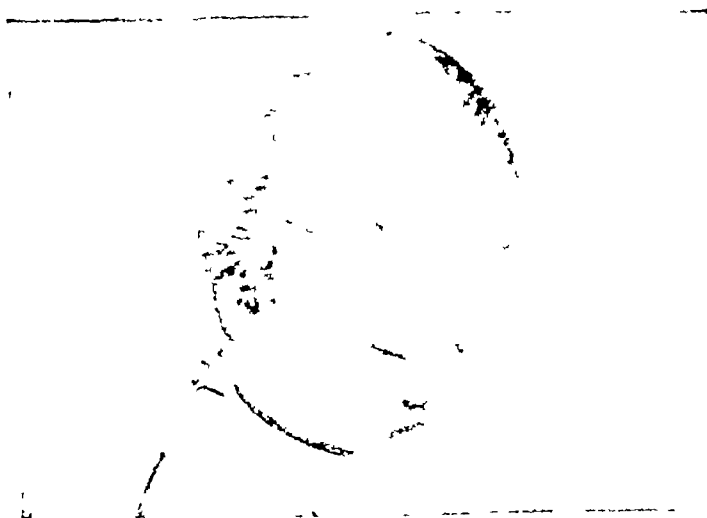
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Communications to the Société Médicale des  
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The Treatment of Rheumatoid Arthritis with Gold  
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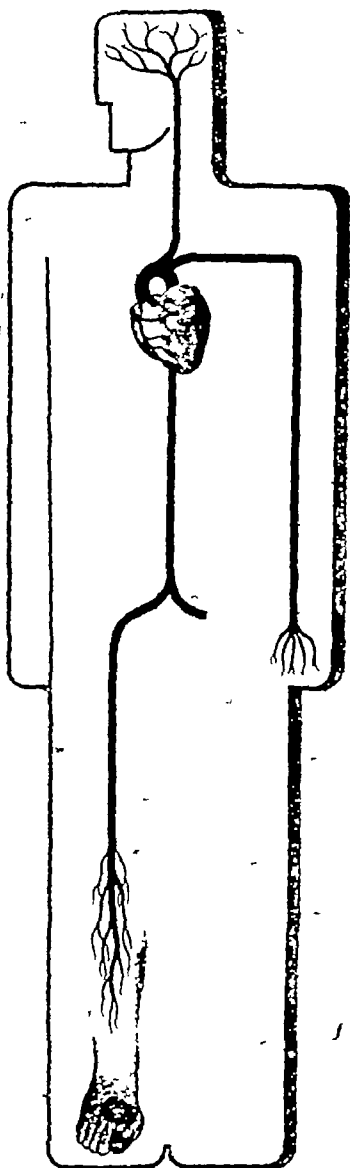
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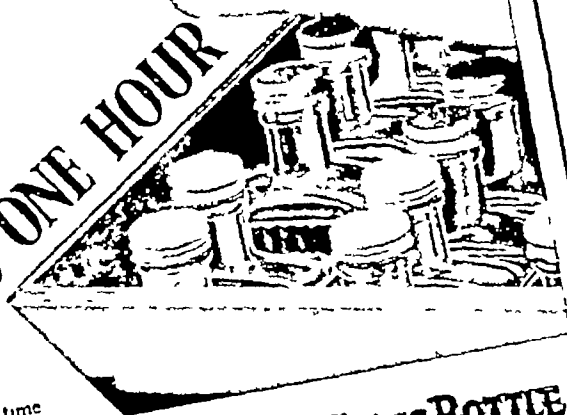
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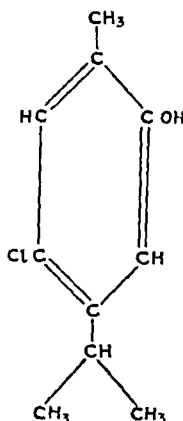
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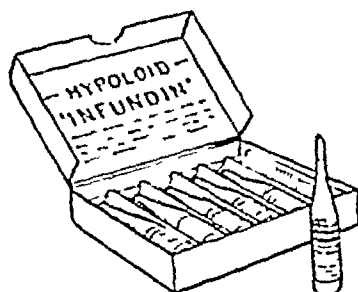
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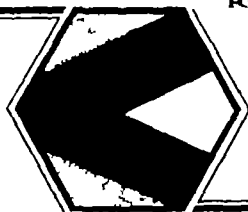
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## Maternal Mortality and Morbidity

### The Final Report of the Ministry of Health Committee

By SIR WALTER FLETCHER, KBE, CB, MD, ScD.,  
FRCP, FRS

*Secretary of the Medical Research Council*

FEW words are needed to stress the gravity of the problems of maternal mortality to the people of this country and to the practitioners who serve them. Over fifty women die in childbirth every week in England and Wales alone, as the result of fulfilling the physiological function of motherhood, and of these no less than twenty a week die because of septic infection. A great but unmeasured burden of morbidity and suffering, as direct after-results of childbirth, is laid every year upon many thousands of other mothers.

The Departmental Committee have endeavoured by close inquiry to unravel the complex of factors, social, economic, administrative and clinical, that contribute in their several degrees to this deplorable loss of life and health. They have stated concisely the findings they have reached and the practical measures they recommend. The Report is now before the profession and the public and will no doubt receive early and earnest consideration.

Very many of the factors concerned in our national

But in the last year or two of economic depression there have been some signs and many dangers of a regression in this recent national escape from rickets and the protean evils that spring from it. Recent research work happily has brought means of making adequate supplies of vitamin D readily available for all nursing mothers and growing children throughout the population. Administrative action is lagging too far behind the advances in knowledge that have brought these increased powers. Since the effect on the maternal mortality rate can be expected only some eighteen years or more in the future, when the babe of to-day is ready for motherhood, there is an urgent national call for rapid action now.

The same researches have brought potentially an immeasurable boon to our fellow-subjects in India, where the tale of rickets, osteomalacia, and the resulting pains and dangers of child-birth, is one hardly to be surpassed for the intensity and volume of its horrors. It is a tale that will never be ended until we give the realities of life there a higher consideration in the theory and practice of Indian Government than issues fundamentally subordinate to them.

It is to recent researches in another field of work that the Report owes in perhaps the greatest degree the new hopes it can hold out to the nation of a reduced maternal mortality. Sepsis accounts for 37 per cent. of all the deaths, and 18 per cent. of all the deaths are due to sepsis after quite normal labour. I think that many will agree that both the most interesting and the most hopeful chapter of the Report is that dealing with puerperal sepsis and the research work organized to attack it. A great debt of obligation is owed by the community to Queen Charlotte's Hospital for their enlightened action in forming and equipping a research unit in which special puerperal wards are in organic relation to the research laboratories. The Medical Research Council have been enabled to

co-operate by supplying the services of the Director, Dr. Colebrook, and other help. More recently the Rockefeller Foundation have made a generous financial provision towards the support of the scheme. The results of much of the work done here that already finds its application in practical use, are given in the Report. Similar work of great value has been done at University College Hospital, in laboratories of the Ministry of Health and of the London County Council, at Aberdeen, at Sheffield, and at other centres. Better precision has been given to the guidance offered in the performance of the "antiseptic toilet" of the patient and of her attendants. Above all, certainty has fully replaced suspicion that the septic organisms causing puerperal deaths are often derived from the mouths or noses of those about the parturient mother. It is hard to believe that any who read the evidence provided in the Report will take the responsibility of ignoring the strong recommendation of the Committee that the same precautions of using gloves and face-masks should be adopted during every labour as are thought indispensable now at every surgical operation. In the absence of face-masks, other precautions such as securing the absence of infected "carriers," the avoidance of talk in the labour wards and of bending unnecessarily over the patient become more imperative.

Very many problems of the streptococcus remain unsolved, and their intricate variety is well shown in the programme of researches in progress or contemplated which is given in the Report. In particular should be noticed the studies being made, by Dr. Colebrook especially, of the anærobic forms of streptococci as distinguished from the ærobic *Streptococcus pyogenes*, which have now been definitely associated in many cases with puerperal fever. These anærobes appear to be chiefly endogenous in origin—derived from the mother herself. They have hitherto escaped common notice because they are missed of



Dr Fairbairn, as it happens, in the next following article He speaks of the importance of " removing fears and anxieties " from the mind of the mother in ante-natal preparation He urges that the mother should be encouraged to accept parturition as a normal function, to be approached with confidence and pride rather than with fear I hope I do not misrepresent him if I say that he implies what it is surely almost irresistible to believe, that a mother is more likely to be in a placid frame of mind if she be attended before and during *normal* labour by a competent midwife rather than by a male doctor The experience quoted already from the Netherlands and Scandinavia points strongly in the same direction, though it must be held in mind that the social status and technical training of the midwives there are much higher than are those in this country What is the ideal at which we should aim? Ought normal midwifery to be increasingly in the hands of women? If so, we should aim at securing as soon as possible such conditions as will allow it to be recognized as one of the most honourable ambitions for a well-educated woman to serve her own sex by entering the responsible calling of midwifery Does the profession approve of an increasing limitation of qualified practitioners to the management only of difficult and abnormal labours? These are questions that clearly present themselves for study and answer I do not presume to offer any answer here, but the physiological considerations I have mentioned have obvious interest in relation to them

# Principles in Ante-natal Care in General Practice

By JOHN S. LAIRBAIRN, M.A., B.M., B.Ch., F.R.C.P.,  
F.R.C.S., F.R.C.O.G.

*Consulting Obstetric Surgeon, St. Thomas's Hospital*

ANTE-NATAL supervision is inseparably bound up with the rest of midwifery practice—hence the natural criticism of the public ante-natal clinics that they “pigeon-hole” a section of obstetrics which is really an integral part of the whole and are frequently placed under the charge of practitioners who have no responsibility for their patients during the natal and post natal periods. Thus those in charge under such conditions suffer from the grave disability of being unable to learn from the most compelling of instructors, their own failures. The justification usually given for the breaking of this universally accepted principle is that the establishment of such clinics was forced on the public health authorities by the failure of general practitioners and midwives to do the work adequately. But the family practitioner is in a far better position to undertake the ante-natal care of his own patients whom he will attend through delivery and the puerperium. Now that he is making the effort—perhaps a little late in the day—he is not doing it as well as he might because he has concentrated too much on the purely medical aspects of ante-natal care and has given insufficient attention to the educational and social services that form so important a feature of hospital and public clinics. The disregard of these less obvious aspects, especially that portion comprised in the term “mothercraft,” arises partly from failure to realize that ante-natal care calls for the services of both practitioner and midwife, and partly to difficulties

in arranging the necessary team-work between the two.

In order to show the need for co-operation between doctor and midwife, the simplest plan will be to review the services comprised in ante-natal supervision and indicate how they are apportioned between these two co-workers. The more strictly medical services consist of: (1) The supervision of the pregnant woman throughout pregnancy with a view to maintain at its optimum health of body and mind and to discover early and remedy any disturbances that may arise. (2) Care of the pregnancy itself so as to lessen the risk of miscarriage, premature labour or foetal death. (3) The securing of normal labour and lying-in by eliminating all foreseeable complicating factors, such as malpositions, malpresentations and misfits and making provision for special treatment in such abnormalities as ante-partum hæmorrhage. (4) Attention to the breasts to lessen the chances of failure to nurse.

The other services, not so purely medical but none the less important, are hygienic, social and educational in character and difficult to classify. They may be grouped into measures tending to promote the health of mother and foetus, to make the mother confident in her own capacity to bear and rear her family, bring out her maternal instincts and instruct her in the preparations for her confinement and for her child, and in the upbringing of her family. It is in the provision of services such as these that the public clinics have been particularly successful, and it is by the failure to provide something of the same kind for his private patients that the medical practitioner has left a distinct gap in his ante-natal work. Matters of simple hygiene, advice on preparations and talks on mothercraft usually make the strongest appeal to the young mother and strike her as the part of ante-natal care that is most worth while. Especially to the strong and healthy woman in her first pregnancy,

routine examinations and medical supervision generally often seem a needless fuss, whereas she may be greatly concerned about small details regarding arrangements for her confinement, provision for her child and its management after birth. So long as she is well and free from bodily discomforts, the offchance of some complication is too distant a prospect to worry her, and the immediate problem before her is what will suffice for her requirements, what she can make herself or what she must buy and how much she must pay.

At the hospital or public clinic there is a Sister Mothercraft, midwife or health visitor who will see the mother in her home and advise her on the matters that concern her and save her from wasting time and money unnecessarily. These services have not only a direct and immediate appeal, but the contact they make between the midwives and nurses of the clinic and the expectant mother offers many opportunities of obtaining an insight into the character and capabilities of the individual mother, her strength and weakness, and thus show where help is required and how the best can be got out of her. This more intimate association often leads the woman to confide in the visiting midwife and mention troubles and discomforts that she regards as beneath the doctor's notice or that may have escaped her memory in the excitement of the thorough investigation she underwent at her last visit.

It is now a platitude that successful ante-natal care should convince the expectant mother of the need for it and without making her think she is a sick woman, or a "patient" in the usual connotation of the word. The supervision must not only be efficient from the medical side, but must be helpful in other ways readily obvious to the supervised and adapted to her individual needs and circumstances. As soon as the educational and mothercraft side of ante-natal care is taken into account, the need for co-operation with a midwife

becomes clear; likewise that without it the private practitioner cannot give services equivalent to those of the public clinics. He must take a leaf from their book and adapt it to the special requirements of his type of practice, if he is to compete with them in this regard. Further consideration of the medical services will show that a midwife or maternity nurse is almost as essential an assistant to the doctor in ante-natal supervision as for attendance during labour and lying-in.

The next principle to be emphasized is that ante-natal care, if it is to effect its purpose, must be thorough, i.e. the supervision must be close and inspections frequent. Taking the medical service alone, the first examination should be conducted as early in pregnancy as the patients can be persuaded to report and should include a general medical overhaul, search for focal sepsis (teeth, tonsils, vaginal discharge, urinary infections and so on), mammary examination, blood-pressure estimation, testing of urine and possibly blood (e.g. in suspected venereal disease). In the later months repeated abdominal examinations for obstetrical diagnosis will be required. The Interim Report of the Departmental Committee on Maternal Mortality and Morbidity suggested as the minimum scope of adequate ante-natal supervision (issued as a memorandum for those in charge of clinics) that the first medical examination should be at or before the 16th week, another at the 24th and 28th weeks, then fortnightly to the 36th week, and weekly from then to term. Without frequent examinations and constant observation, many conditions that arise rapidly or insidiously without symptoms, such as albuminuria and rise of blood pressure, may become serious within a week and the favourable moment for early treatment be lost. That conditions of this type are rare is no reason for neglect of constant supervision, as the practitioner's time and expense to the patient can be

saved by using the services of the midwife for general supervision, testing the urine and even for blood-pressure estimations which are quickly learnt by any intelligent woman accustomed to such work.

Many defences, good and bad, may be made on behalf of the shortcomings of the ante-natal service in private practice, e.g. the difficulties of adapting clinic methods, the different type of patient dealt with, securing the right type of midwife, and so on. It may be said that private patients regard themselves as so sufficiently educated that many of the services mentioned are unnecessary. But there is no class that would not be the better for them, though there may be occasional individuals. One class that cries out for them more than any other and forms a material proportion of most practices is the professional or small fixed-income class, of varying degrees of education but unable to afford much in the way of domestic help. The mother may be anxious to nurse her child, but is in need of advice as to how it can be done with the least interference with her other duties; she must know how the work that falls on the mother who must do everything for her children can be made as little burdensome as possible. Many problems arise from the patients selecting their maternity nurses and refusing to accept one chosen by their medical attendant or entering a nursing-home recommended to them by friends but not approved by their practitioner. That there are grave hindrances in private practice, which do not exist in hospital or clinic practice, is undoubted, but none are insuperable, and one object of this article is to urge that an effort should be made to overcome them. If there is a nursing home within reach that will follow his principles whole-heartedly, arrangements might be made for the practitioner to conduct his ante-natal work there, both for patients entering the home for their confinement and for those who will be delivered

at home, provided the nurse will be one of the midwives from the nursing-home.

The family practitioner, moreover, starts with a great advantage over the hospital or public clinic in his more intimate knowledge of the personality of his patients, for another principle in ante-natal care is that the co-operation of the patient is essential to its success. If co-operation between practitioner and midwife is important, even more so is that between the pregnant woman and those in attendance on her. Also it can be established only by a close understanding by her attendants of the individual characteristics and circumstances of each one under their care and a study of the response she makes. Thus time given to talks and discussions about the many trifles that occupy her mind is never in vain, and the care and thoroughness with which her case is investigated arouse in her the confidence in her attendants and in herself that is a necessary prelude to successful supervision.

As already indicated, the presentation to the woman's mind of child-bearing as a natural process must be a guiding principle throughout all talks and examinations. Most women have a proper perspective, but a material proportion approach pregnancy and labour with a view distorted by what they have heard or read of the terrors of labour, of its long duration and its dangers. Some may have had a previous unfortunate experience which has left a marked impression, or the pregnancy may be unwelcome, possibly even deeply resented and its termination unsuccessfully attempted, with an added fear that danger in labour is thereby increased or that the foetus may be malformed. A not uncommon type requiring special management is that of the woman who looks on child-bearing as a burden and is unwilling to make any sacrifice she can avoid. These are examples of difficult cases requiring careful considera-

tion from the psychological side, but all will benefit by confidential talks in which the woman can show what is in her mind and possibly reveal hidden dreads that otherwise she would keep to herself, thus possibly interfering in some way with normal function.

However thorough, no ante-natal examination will allow a prediction to be made with certainty that the labour will be easy and physiological. The woman may be physically strong and well formed, the presentation normal and examination disclose no cause of disorder of function, but, when labour has begun, the expulsive powers may be ineffective, and delivery ultimately terminated by the forceps. If the weakness of uterine function continues into the third stage, delay and hæmorrhage may also complicate it. Although the maintenance of normal function throughout the reproductive process is the primary objective of ante-natal work, the practitioner must be struck by the little help to be had in answer to the most outstanding question in midwifery: What are the factors that promote, and the factors that hinder, uterine action? It can safely be said that if the practitioner can succeed in getting his patients to respond to the education given in the ante-natal period he will increase his proportion of natural deliveries. By removing fears and anxieties and instilling in their place confidence in their power to see the business through themselves, some may be stimulated to follow the example of their maternal forebears and do with as little adventitious aid in labour as they had. Each one should be assured, however, that, although the more she herself can do the better, relief can always be given for the pains when they become too much for her and that she can place full reliance in her attendants for help when required. In first pregnancies the woman should be given instruction on the progress of labour so that she knows both what to expect and what is expected of her; particularly what happens during dilatation



when the need is for her to relax and not to strain until the expulsive stage is reached. Some very valuable hints on these points may be obtained from a book by Dr C V Pink<sup>1</sup> intended for the use of pregnant women to supplement advice given by their doctor. In it this writer describes his own method of trying to produce in his patients the attitude of mind that is most favourable to an easy and a natural delivery. He ends his instructions to the expectant mother by saying (author's italics) *that she will not suffer unbearable pain*, and adds, "If you are *very* successful, you will rather be *thrilled* by the so-called 'pains.'"

In order to emphasize the need for an effort to promote normal function in labour by ante-natal instruction, it may be well to consider the case of the women who select a midwife as their attendant, for, as a class, they show the largest proportion of normal labours. This class approaches child-bearing as being of the natural order of things and, without further thought in the matter, the women regard themselves as able to do the business themselves with the help of a midwife who can, however, call in a doctor in the event of accident or complication. As a class they offer a far simpler and a far easier problem than the women who engage a medical practitioner for the very reason that the latter expect much more in the way of artificial aid, such as anæsthesia and early delivery by the forceps. Statistics show that the midwife-employing class has a lower maternal mortality and a lower stillbirth-rate than the general rates for the country as a whole, and that those countries where attendance by midwives is the rule have lower mortality-rates than those where medical attendance is customary. The most obvious factor in the production of these differences is that of the attitude of mind in which the two classes of women approach child-bearing, normal function being thus attained to a much greater degree in the one group than in the other.

It is the child-bearing woman herself who determines the lower mortality in the lower social grades, and not the type of attendance. That there are many other factors in her make-up that play a part in this result cannot be questioned, e.g. her greater hardihood, greater power of withstanding pain, fatigue and the stress of circumstances generally and possibly, as often asserted, a greater immunity to infection; but her mental attitude (or perhaps absence of it) is a very material item among them. If this point is granted, it follows that the medical practitioner who has to deal with the more difficult type should seek some method to develop a state of mind in his patients more akin to that of the midwife-employing class, especially amongst those sufficiently educated to be responsive.

As the intention of this article has been to lay down the principles underlying ante-natal care rather than to go into detail, it is impossible to say more of instruction in general hygiene than that it is of supreme moment. The pervading idea is the same as elsewhere, and the pregnant woman must not think of herself as an invalid.

In conclusion, the importance of atmosphere may be emphasized, for the effect on the woman concerned is greatly increased by impressions of the same kind from all quarters and from all with whom she comes in contact. Atmosphere is not easily realized apart from an institution, but if, for instance, her practitioner sends her for ante-natal instruction to a nursing home imbued with his ideals, whose midwives and nursing staff are prouder of success in the degree of natural function attained than in the number of Cæsearean sections or other operations performed, the omens will be favourable for her following the usual custom of the place.

#### Reference

<sup>1</sup> Pink, C. V. "The Ideal Management of Pregnancy" London Cassell & Co 1930

# The Treatment of Disordered Menstruation

By FREDERICK JOHN McCANN, M D , M R C P , F R C S

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IN no department of practice can prevention be more profitably employed than in the management of menstrual disorders. Girls and young women should be encouraged to seek medical advice when menstruation is absent, scanty, excessive, painful, or too frequent. When the orderly sequence of menstruation is disturbed injurious effects soon follow through the production of a vicious circle, the general health affecting menstruation and disordered menstruation affecting the general health. There seems to be a tendency at the present time to belittle the disabilities which disordered menstruation may produce and thus to neglect early and efficient treatment. On the other hand, to err in the opposite direction by encouraging a girl or young woman to regard her menstruation as a recurring disease is equally harmful. Those who do suffer at the menstrual periods are not capable of the same activity at these times as their more fortunate sisters, and they should seek treatment without delay. Indeed, the efficient treatment of menstrual disorders in early life would do much to diminish the sum of female suffering in later life, and would at the same time have an important influence on generative power. Parents, guardians, school-mistresses, school medical officers and all those who have to supervise the upbringing of young girls should see to it that disordered menstruation is not overlooked but where possible is remedied at once

MEASURES TO RESTORE OR TO MAINTAIN THE  
GENERAL HEALTH

*Fresh air.*—It is scarcely necessary to insist on the advantages of fresh air were it not for the fact that even now the ventilation of some schoolrooms, and still more, of some dormitories, is far from satisfactory. Girls coming from the country to cities often exhibit a deterioration in their general health accompanied by disordered menses. Living in a close atmosphere is especially injurious. They should be encouraged to seek the benefit of fresh air and should be discouraged from exchanging the atmosphere of the workroom or office for that of a badly ventilated picture palace or other indoor entertainment.

*Diet*—Employers of labour are beginning to realize that the preservation of the health of the worker is a "paying proposition." To this end wholesome meals are being provided for female workers, and I have been informed that the resulting improvement in their health and working capacity has fully justified the experiment. The diet of school girls is in many instances far from satisfactory, the supply of good milk, good butter and good eggs is often lacking, while sugar and starchy foods are given in excess. Unless girls are suitably fed during the years of active bodily growth their reproductive system suffers, both menstruation and later generative power being affected.

*Exercise.*—A moderate amount of exercise is beneficial, but there is a tendency at the present time to go to excess, and when undue fatigue follows it is harmful. Complaint is not infrequently made by a worker that she is too tired after her work to take exercise, more especially where that work involves hours of standing on her feet, or, again, her tiredness may be due to the close atmosphere in which she works, or yet again both may play a part. Still, she should be encouraged to seek the benefit of fresh air

by walking to or from her work (or a part of the way if the distance be too great), walking at least three or four miles every day. Those who are able to afford it can have the benefit of lawn tennis, golf, swimming, fencing, cycling or horse riding. Nevertheless, walking remains within the reach of all and is an ideal form of exercise. Physical exercises should be practised at home even if only for ten minutes each day, especially those concerned with the abdominal muscles, the muscles of the back, and the respiratory muscles, the correct method of breathing being most important. Each movement should be repeated three or four times and the same muscles exercised daily. Irregular or intermittent exercises are of questionable utility.

*The action of the bowels*—The close relation between the large intestine and the genital organs renders necessary the careful regulation of the action of the bowels. The regulation of bowel action should never be omitted in any scheme of treatment, for constipation may hinder the efficacy of remedies which are only useful when the bowel action is normal. Moreover, the administration of a saline purgative before the onset of menstruation often exerts an important influence on the character of the menstrual flow.

*Hygiene of menstruation*—Those who do not suffer during menstruation naturally resent any restraint upon their activities, but those who do suffer should avoid fatigue, both at work and play. Warm baths should be taken, or failing this, cleansing of the external genitals with warm water. Frequent changing of the diaper is necessary especially when the flow is excessive. The dirty diaper is a cause of a mild type of infection which is associated with the presence of a foetid discharge at the termination of menstruation, and which is augmented in those of unclean habits. This constantly recurring infection is a factor in the etiology of female ailments which seems to have escaped observation. Yet I believe it to be of considerable signi-

fiance, and in any circumstances it serves to emphasize the great importance of local cleanliness during menstruation. Cleanliness is a method of prevention capable of being practised alike by rich and poor. Cold baths should be avoided. Those who take a cold bath for the purpose of arresting or diminishing the flow expose themselves to the risks which may follow the sudden suppression of the menses.

#### MEASURES TO DEADEN OR TO DESTROY PAIN

Pain is the symptom which above all others prompts the sufferer to seek relief. The amount of pain—always difficult to estimate—varies from slight and transient to a severity which may truly be described as agony, and yet there may be no detectable pathological lesion. I am not here concerned with disordered menstruation in association with pelvic disease, but only with disordered menstruation for which no cause is discoverable by pelvic examination. Disordered menstruation associated with disease diminishes or disappears with the amelioration or cure of the disease of which it is merely one of the signs or symptoms. To relieve menstrual pain—dysmenorrhœa—numerous drugs are now available and each practitioner doubtless has a particular analgesic drug or combination of drugs on which he pins his faith. Ammonol, phenazone (antipyrin), aspirin, phenacetin, pyramidon, salipyrin are useful. It is a good plan to give a larger initial dose, e.g. ten grains—followed by five grains every hour for three doses if pain persists. The addition of caffeine or aromatic spirit of ammonia is helpful in tending to counteract the cardiac depression which may follow the use of phenazone or even of phenacetin or aspirin. Aspirin, grs. v, phenacetin, grs. v, and caffeine citrate, grs. ii, together form an analgesic compound of proved value. In cases of emergency when the pain is agonizing a more potent sedative, such as opium or one of its derivatives, may

menstruation, although generally associated with pain, may be painless. This is membranous dysmenorrhœa and is not a disease, but merely an example of exalted physiological action. The amount of shedding or exfoliation of the uterine mucosa during menstruation varies in different women and in the same woman at different times. Some pass shreds and pieces, others portions of membrane, and again others membranous casts. In the same woman the severity of the pain varies at each monthly period. Membranous dysmenorrhœa is not always remedied after a pregnancy, nor even after subsequent pregnancies. Curetting, repeated if necessary, is claimed to be beneficial; and iodide of potassium and arsenic are useful. The older treatment by mercury in the form of vaginal pessaries and the application of silver nitrate to the endometrium once or twice in the interval between the menses was said to give satisfactory results. The painless passage of uterine casts does not call for treatment, for as already mentioned they are not the products of inflammation. It may be necessary to reassure the patient when the appearance of casts causes mental distress, even in the absence of pain. When pain can be controlled by suitable remedies, treatment applied to the endometrium is unnecessary. It is here interesting to reflect how the accepted pathology of a disease leads to corresponding changes in treatment.

#### INTERMENSTRUAL PAIN

This term is applied to a regular recurrence of pain in the middle of the interval between each menstrual period. The pain is referred to the internal genitals, and may last a few hours or for one, two, or three days, and is occasionally accompanied by a slight discharge of blood. This pain must not be confounded with pain or discomfort beginning regularly a week or ten days before the onset of menstruation,

for the victims of middle pain often have little or no discomfort immediately preceding or even during menstruation. The periodic ripening and bursting of the Graafian follicles is assumed to be the cause of middle pain. Chronic inflammation of the uterine appendages has been present in some of the cases I have seen, in others no local cause was detected. The inflammatory cases are benefited by ichthyol treatment and the others by glandular therapy.

#### MEASURES TO INITIATE OR TO INCREASE MENSTRUATION

A periodic discharge of blood from the genital passages being the outward and visible sign of menstruation, the quantity and character of that discharge is accepted as evidence of the manner in which this function is being performed. During menstruation there is a widespread disturbance throughout the body which may only become manifest when the menstrual function is not working smoothly. Headaches (often severe), vasomotor phenomena, enlargement of the thyroid gland, irritability, nervousness, depression, may assert themselves and compel attention. Endocrinology has been helpful in this regard, for by the administration of certain glandular preparations, notably those of the thyroid gland, many of the symptoms can be controlled. An effort should be made to discover if there be evidence of excess or diminution in the secretion of any of the ductless glands in all women with disordered menstruation. Much still remains to be elucidated, for even such a common symptom as headache not infrequently defies adequate explanation.

#### AMENORRHOEA

Absent or scanty menstruation is frequent in young girls suffering from anæmia and chlorosis, and when the anæmia is cured menstruation becomes re-established. Climate and environment have an important influence. High altitudes may cause the arrest or



$\frac{1}{2}$  grain doses at bedtime or even  $\frac{1}{4}$  grain is sufficient in the vast majority of cases. If there be signs of excess then the thyroid should be omitted for a week or two or a smaller dose,  $\frac{1}{8}$  or  $\frac{1}{10}$  grain, substituted. A larger dose is rarely necessary and one grain daily should be the limit. It is an interesting observation that beneficial results are obtainable by small doses where large doses sometimes fail. Ovarian preparations, whether of the whole substance or of the corpus luteum, have in my hands been uniformly disappointing. Some of them caused indigestion, but otherwise I could not satisfy myself that they produced any effect. When ovarian preparations were given combined with thyroid I have not observed any increase in efficiency. Let me here deprecate the use of "endocrine bombs" containing a variety of gland products, most of these products are in all likelihood inert and when the "bombs" possess any therapeutic value it is due to a small dose of thyroid which some of them contain.

When the menses have appeared once or twice the problem is not so difficult and the outlook correspondingly improved. In such cases there may be a constitutional cause and I have seen in recent years amenorrhœa follow severe influenza. Many infections do appear to exert an injurious influence on the ductless glands, which continues for a considerable time after the cause has disappeared. Indeed, in not a few instances the reproductive system suffers under the strain, for not merely menstruation but generative power is affected. The influence of shock and fear on the reproductive system is well known in animals. In women amenorrhœa may be so produced, and I recall one example where after a severe shock menstruation ceased for three years, and continued for another three years after marriage.

This woman was treated with iron, arsenic and large doses of thyroid without any apparent benefit. When I saw her she did

not appear to be anemic and, as far as I could ascertain, had not suffered from anæmia. Small doses of thyroid were given to her and a suitable combination of remedies, with the result that her menses reappeared and she later became pregnant and gave birth to a daughter. She now menstruates regularly and is the mother of three children.

A premature menopause is sometimes a source of considerable distress, especially to a young woman, and when atrophic changes are found in the uterus, and especially in the upper segment of the vagina, treatment is useless. Thus it is urgently necessary to begin treatment at once before such changes are produced, for the prognosis in these circumstances is more favourable. When, however, the menstrual cessation occurs a few years prior to the age of the natural menopause no treatment is required. Lactation atrophy or super-involution of the uterus is also favourably influenced by treatment, and menstruation may be restored. The effect of reproduction on subsequent menstruation is a subject full of interest. There is difficulty in determining whether infection or some other morbid influence is at work producing the amenorrhœa. Occasionally after the birth of a child menstruation never reappears, usually, however, the reappearance is delayed for varying periods of time even in those who do not suckle the child.

*Retention of the menses*—When the outflow of the menstrual discharge is prevented by an obstruction, congenital or acquired, menstruation is said to be retained. In brief, the treatment is to remove the barrier and allow the fluid to escape. When this cannot be done it may become necessary to remove the uterus and/or Fallopian tubes when distended with menstrual fluid. It is essential to examine the abdomen of every patient before prescribing for amenorrhœa, and to make a rectal examination in virgins and a bimanual in married women, always remembering that sudden cessation of menstruation in a previously healthy young woman suggests

pregnancy.

#### MEASURES TO DIMINISH THE MENSTRUAL FLOW

The increase of the menstrual flow is termed menorrhagia yet what is excessive for one woman may be normal for another. It is the continuous loss of fresh blood that matters and inquiry should always be made as to the number of days during which red blood is passed. A flow of dark blood for several days, or more commonly dark sanious fluid, implies that clots are being gradually broken up and expelled or that there is some hindrance to a free exit. Morbid causes, both local and constitutional, are at work in most examples of menorrhagia and its occurrence in anæmia is not rare. But here I am chiefly concerned with those cases in which local causes can be excluded. Of these the best examples are met with at puberty when menstruation begins with profuse even alarming blood loss. The cause of this is not known, it is assumed to be due to some endocrine disturbance. Rest in bed, thyroid in small doses and calcium lactate are most beneficial. Curetting is recommended but I have not yet found it necessary. Menorrhagia is often cured by marriage, and it is probable that certain examples amongst the unmarried are due to abnormal sexuality. Excess of ovarian secretion is offered as the explanation. Here again thyroid and calcium are of value but occasionally these fail and then radium—with careful regulation of the dosage—is the best treatment. Curetting as a rule fails or may even increase the blood loss.

Menstruation may terminate with menorrhagia, but there is always the possibility that the increased blood loss is due to some local cause. Both free loss at the menopause and the continuance of "menstruation" beyond normal limits should give rise to the suspicion that cancer is present and it is imperative that the diagnosis should be definitely settled before

treatment is prescribed. After both local and constitutional causes are excluded there still remains a residuum of cases where the bleeding is comparable to that at the onset of menstruation. These cases are benefited by thyroid and calcium, and ergotine senecein compound or stypticin are useful hæmostatics. The use of radium in those resistant to this treatment prevents the necessity for hysterectomy. In cases of emergency when the bleeding is excessive or alarming the woman should be kept absolutely still in bed, should be given ℞xx of Battley's solution (liq. opu sedativus) and the vagina should be tightly plugged with antiseptic gauze. When local or constitutional causes are at work they must be combated, for here the increased blood loss is merely a sign.

#### References

- <sup>1</sup> McCann, F J "The Treatment of Common Female Ailments,"  
2nd ed, London, p 20  
<sup>2</sup> *Ibid*, p 14

# The Place of Surgery in Gynæcology

By ALECK BOURNE, M A , M B , B Ch , F R C S

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FROM being a branch of medicine that clots entirely in the hands of physicians, or that has become a well recognized branch of causes, by reason of the increasing power of surgery in most with pelvic diseases, and the success which anæmia operative treatment. Perhaps in no other branch of the body has the ingenuity and enthusiasm of the surgical mind had greater scope. With the certainty which comes from growing skill the gynaecological surgeon has followed the simple pioneer who lived and 40 years ago by devising an ever increasing catalogue of operations, such as those for the most varieties of prolapse, which have greatly increased the power for treatment.

The first problem that confronts us is whether the given patient should be treated by operation or other methods. Apart from the question of whether she is a suitable operation risk, and careful examination of all physical signs, we have chiefly to assume a proper sense of proportion and ask ourselves whether the abnormal condition discovered can be incriminated as a real and sufficient cause of the symptoms described and secondly to decide upon the ideal operation to meet the case.

Probably no branch of medicine offers greater difficulty than gynæcology in the decision upon the value of operative treatment for many of its patients. Perhaps more in the practice of gynæcology than any other branch of surgery, do nervous or neurotic con-

ditions intrude, closely simulating the symptoms caused by organic conditions, and occasionally very difficult to diagnose with certainty. Indiscriminate operations done for these patients are certain to end in disappointment, and frequently leave them worse than before, and start a series of operations, each of which is less necessary, or more harmful, than the one preceding.

Let us first consider in more detail the so-called emergency man with multiple pains, the chief of which the woman to the pelvis, nervous, frightened, and tired. The chief complaint is often backache, with, perhaps, sedative and menstrual disorders. This patient with anxiety belongs to one of two categories. The first, and causes a comprises those patients whose neurosis is increased by non-organic causes, the commonest of which is anxiety or fear of one kind or another, the second includes a comparatively small group

<sup>1</sup> McCann whose symptoms arise primarily from some condition in the pelvis and, by their long

<sup>2</sup> *Ibid* n, induce a secondary state of fatigue, anxiety and depression. This clinical type closely resembles the first in symptoms, but physical examination will reveal no adequate pelvic lesion. Successful treatment will primarily depend upon the diagnosis of this adequate cause, and much of the value of experience is in the ability, not so much to find a lesion, as to assess

Few of us have expert knowledge of the neuroses or psychology in general, but we should all be sufficiently acquainted with this most important branch of medicine to enable us to recognize a neurosis as a primary anxiety state or a fatigue secondary to physical abnormalities.

Let me illustrate by consideration of a common condition: A nervous, worried and tired married woman who has had children complains of dyspareunia. In addition there will be less defined symptoms referable to almost every part of the body, such as backache, headache, dysmenorrhœa, flatulent dyspepsia, insomnia

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pain as the patient describes. For example, the uterus again may be retroverted, but in addition to being tender, it will be enlarged and apparently fixed, and the woman will know at once the moment the examining finger touches it, while palpation of the other parts of the pelvis will not be noticed. If in addition there are enlarged, tender and prolapsed ovaries, with possibly infected and palpable tubes, the organic origin of dyspareunia needs no further consideration. This woman ~~obviously~~ requires local pelvic treatment, the specific complaint is a ~~relative~~ measure, but more often dyspareunia and men

may belong to one and some detail the types of patients largest, comprises dyspareunia because they illustrate derived from non- of the two fundamentally different which is an anxiety contains many other examples the second physical examination must be made of the women whose history and relations, her mode of life, her physical condition mental constitution, as well as the situation, induce a condition of the pelvis, before it is proper depression. Treatment.

First in symptoms considered the difficulties presented over some patient, we have next to consider, first, and will primarily conditions can be corrected by surgery, and because, a right type of operation to select.

For the first we do not see conditions about which there is much doubt, but we have that operation is by far the best psychological, but usually the majority of all cases of acquainted with this most important fibroids which cause to enable us to recognize the most common cause of dyspareunia. But there are anxiety state or other conditions, retroversion of the abnormalities. Such a case is known to be a case of leucoplakia of the

Let me illustrate the various cases of opinion.



vaginal methods. The old ideas of the pathology of endometritis were also responsible for the widespread practice of curettage, for they described a number and variety of morbid conditions of the endometrium which we now know to be nothing more than the physiological changes of the menstrual cycle. It is natural, therefore, that an imperfect understanding of the pathology should have misguided the use of the curette.

The use of the curette is inversely proportional to the gynæcological experience of the operator. It is important to remember that its sole function is the removal of the endometrium, and, unless this is abnormal, the instrument can have no proper use. If, however, the endometrium is abnormal then the curette frequently, though not always, has a useful therapeutic value. It is surprising, even when the symptoms seem to be concerned with the endometrium, as, for example, in some forms of menorrhagia, that it presents no abnormality, even on careful histological examination. Menorrhagia of young adult women and adolescents is seldom improved by curettage, and frequently the hæmorrhage of chronic metritis is worse after the operation. But in some well-defined conditions it is the only cure. Chief among these are the menstrual excess and irregularity following abortion and labour, especially if these were complicated by mild local infection of the uterine cavity. Here we have a true chronic endometritis of inflammatory origin following directly upon an acute infection. It is obvious, too, that polypi of various kinds, particularly the placental polypus after abortion, can be efficiently scraped away with the curette. Not only is the instrument often quite useless, but at times it is used with the utmost danger. During any acute infection, however mild, after labour and abortion the curette is likely to convert a local into a generalized infection, and, therefore, should never be used. It is also used with considerable risk if a chronic salpingitis is present, and is not without

danger when passed through a cervix which is freely discharging muco-pus.

As a diagnostic instrument in cases of suspected carcinoma of the body of the uterus the curette is often an essential instrument. An illustration of our changing views is the answer given by the candidate sitting for the examination in gynæcology. When given a curette and asked what is its function he usually describes it first as a diagnostic instrument.

Another operation which is commonly performed and often disputed is amputation of the cervix. It has long ceased to be a treatment of carcinoma, and is now only practised for leucorrhœa, erosions, tears, and conditions which may, perhaps, be inaccurately called pre-cancerous. As a part of the operation for severe prolapse it is done with a different object, namely, the removal of a greatly hypertrophied or elongated cervix. My own view is that for all those conditions described above, causing a distressing leucorrhœa, especially if there is a serious ectropion of the torn lips, the best of all operations and treatments is amputation. In these cases medical treatment gives no hope of success, and plastic operations on the tears are liable to imperfect healing. Moreover, trachelorrhaphy leaves behind the infected and discharging cervical canal.

When the cervix is wholly amputated just below the level of the internal os by a neat, clean operation, the patient can be assured that the discharge will disappear within about two months, sometimes earlier, and that a dangerous portion of the womb will no longer be a menace to her. Success is judged by the disappearance of leucorrhœa, and in the large majority this is the result. Failure is liable if the cervix is not removed at a high enough level, or if by ragged incision of the vaginal wall the suture line at the end of the operation is uneven, and an incomplete covering of the cervical stump. It is urged against the operation that secondary hæmorrhage often occurs, sterility may be caused,

and labour may be difficult, and that dysmenorrhœa may follow due to a cicatricial contraction of the new os. All these things can happen, but if the operation is done properly, for example, if a wide dilatation of the cervix is first obtained, all bleeding firmly arrested by ligature and suture, and the cut edge of the vagina is not tucked into the new external os, the complications are remarkably few. So many gynecological patients are the victims of the cervix, so much minor worry and discomfort is caused by vaginal discharge, and medical treatment so commonly fails that I have no hesitation in advising amputation in a large proportion of cases.

On the subject of operative treatment of uterine displacements a whole article could be written. The older textbooks have long descriptions of the different varieties of retroversion and retroflexion, according to the exact anatomical position taken up by the cervix and body, while the number of operations designed for their correction is out of all proportion to the clinical importance. The questions which arise are, firstly, if retroversion should be corrected, secondly, whether they should be treated by pessary or operation, and thirdly, what variety of operation is the best.

I have already touched on this problem earlier in this article, and I can only repeat that every care should be taken to be sure that symptoms are actually caused by the backward position of the uterus. It is not enough that the patient has backache, or vague abdominal pain, or even sterility. There must be physical signs commensurate with and corresponding to the symptoms. For example, retroversion in a young single woman rarely, if ever, needs attention even if she has dysmenorrhœa. In other cases if the uterus is freely mobile, insensitive and not enlarged its position is of no importance. Surgery is, however, usually necessary if, after an abortion or childbirth, the uterus is found to be bulky, completely retroverted, low lying, very tender, and apparently (though seldom actually) fixed. Here

there are symptoms which correspond to the pathology. Chief of them is dyspareunia, backache on standing, relieved by lying down, and menstrual disturbances. Medical treatment for this well-defined condition usually fails because of the long period of rest that is necessary. An operation can be counted on curing the patient, but it is necessary that it should be comprehensive or it will fail. Ventro-suspension only of the uterus is not enough. Curettage should first be done, followed by a plastic repair of the perineum if, as usually, there is a vaginal prolapse. The abdomen should then be opened, and the uterus suspended by shortening of the round ligaments. If, however, prolapse is the primary condition with retroversion only a secondary or incidental condition, causing no special symptoms, then replacement of the uterus can generally be effected by a wide plastic operation on the vault of the vagina, with or without amputation of the cervix.

Retroversion also becomes important in operations for salpingitis. The uterus, if not removed, should always be suspended after removing both adherent tubes which leave a raw area in the pouch of Douglas and on the anterior wall of the rectum. Otherwise adhesion of the heavy uterus will fix it in the cul-de-sac, with the certainty of dyspareunia and very probably a continuance of menstrual disorders.

In general, I would say that fixation operations for backache alone are not often required. Where backache is the chief and primary symptom it is seldom that the pelvic organs can be the cause. Where, however, there is backache on standing, and relieved by lying down, there may, though not necessarily, be one or other form of prolapse, sometimes associated with retroversion. But the real cause of the backache is due more to prolapse and less to retroversion, and any operation which fixes the uterus and neglects the perineum is bound to fail.

Let us pass on to the consideration of hæmorrhage

and if occasional exacerbations of pain with temperature and bleeding spoil her life, then the tubes, and usually the uterus with them, should be removed

The indication for operation also depends upon the severity of associated menstrual disorders, as well as upon the liability to relapses of acute attacks. The menorrhagia and dysmenorrhoea may by themselves be sufficiently incapacitating to demand a curative treatment, and if this is the case, only surgery can meet the case. The treatment of chronic salpingitis affords good examples for the illustration of the value of radical methods, and the place of conservatism. The more I see of this disease causing recurrent symptoms, the less patience I have with medical or palliative treatment. We all know how remarkably enlarged tubes will shrink and disappear as palpable swellings during convalescence from an acute attack, but if, when the resolving process has exhausted itself, the tubes are still palpable as tender swellings and remain so while under prolonged observation, I have no hesitation in recommending their removal, together with the upper part of the fundus of the uterus.

# Genital Prolapse

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THE various lesions which comprise genital prolapse are of such common occurrence in general practice that no symposium in The PRACTITIONER devoted to gynaecology would be complete without some reference to them. It has been said there are only two classes of women, those who complain of headache and those who do not. There is certainly a large and important class who complain of falling of the womb, bearing down, or some other of the many symptoms associated with downward displacement of the pelvic organs.

Prolapse of the uterus, genital prolapse, or sacro-pubic hernia is a condition which may affect the whole of the pelvic organs and not merely the uterus. That this is not always recognized is shown by the fact that gynæcologists are frequently asked to remove the uterus in order to cure so-called falling of the womb. It is true that after such an operation the uterus cannot fall again, and to that extent the patient is cured, but other structures, such as the bladder and vagina, will continue to descend and her condition may be actually worse than before.

In order to understand how prolapse occurs it is necessary to have some knowledge of the various structures which support the organs resting upon or passing through the pelvic floor, but a brief mention of these will be sufficient for the purpose of the present article.

By far the most important is a mass of fibro-muscular tissue which extends inwards from the lateral walls of the pelvis and is firmly attached to the sides of the cervix and upper third of the vagina. An extension of

this tissue forwards under the bladder, and called by some authorities the pubo-cervical muscle, forms the principal support of that viscus. Less important are the levator ani muscles lying at a somewhat lower level and the superficial sphincter layer surrounding the vulva and anus. So long as the fibro-muscular tissue remains intact injury to the levators will have no serious effect on the position of the pelvic organs and damage to the perineum and superficial sphincter layer will merely lead to enlargement of the vaginal orifice and weakening of the supports of the lower part of the vagina and urethra

CLASSIFICATION of the  
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(a) incomplete,

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(4) prolapse of the

rectocele; (5) dislocat-

(1) In cystocele the

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bladder through the pubo-ce-

(2) In classical prolapse there is descent of the anterior vaginal wall beginning below and extending upwards to the cervix, traction on the cervix, retroversion and descent of the uterus and, finally, descent of the posterior vaginal wall beginning above and extending downwards. In this variety cystocele is usually present, also descent of the pouch of Douglas with its contents. If the perineum is intact the rectum and lower third of the posterior vaginal wall are

affected, but otherwise complete prolapse of that and possibly rectocele may occur. In the great majority of cases the structures lying behind the posterior vaginal wall are extra-peritoneal fat contents of the pouch of Douglas. Complete

classical prolapse is commonly called procidentia.

(3) Vault prolapse with congenital elongation of the vaginal cervix is of special interest as it is the type usually met with in nulliparous women. Here the long cervix descends first and drags down the vaginal fornices behind it.

(4) True rectocele is comparatively rare as normally the rectum is firmly fixed to the sacrum and has only a loose attachment to the middle third of the vagina in front. Moreover, the anal and vaginal canals are separated from each other by the perineal body to which both are firmly attached. Damage to the perineum, however, may result in adhesion between the two canals, and then both may descend together and form a rectocele.

(5) Dislocation of the peri-urethral wedge is frequently associated with true prolapse, particularly cystocele, but is really a separate lesion affecting the supports of the urethra, including the extrinsic vesical sphincter.

#### ETIOLOGY

Sagging of the fibro-muscular supports of the pelvic organs is the essential cause of prolapse and in the great majority of cases this follows the strain thrown upon them during labour. Increased intra-abdominal pressure from other causes such as hard work, chronic bronchitis or constipation, may also play a part, especially if the supports are already weak as a result of poor development or faulty nutrition. All forms of prolapse are commoner in industrial areas and amongst the poorer classes, and particularly so in Lancashire on account of the hard work in the warm, humid atmosphere of the weaving-sheds and the necessity, for economic reasons, to return to work too soon after the confinement.

The surest way to produce prolapse would probably be to deliver with forceps before the ring of the cervix had passed above the foetal head, but it is doubtful if



this particular method of delivery is responsible for many cases as forceps are seldom applied under such circumstances, and 40 per cent of all prolapses occur in women who have never had any instrumental interference at their confinements. Dislocation of the peri-urethral wedge is also intimately bound up with childbirth and is probably due to the child's head being forced out too close under the pubic arch as it might be by over enthusiastic efforts to save a perineal tear by continually pressing the head against the tissues of the vestibule or perhaps by misdirected traction with forceps at the pelvic outlet.

The commonest variety of nulliparous prolapse is that associated with congenital elongation of the vaginal cervix, and in these cases one must suppose that the latter acts as a foreign body which as it is extruded drags its vaginal attachments and, therefore, the vaginal vault along with it. Occasionally, however, one does meet with the ordinary varieties of prolapse in nulliparæ, and then hard work and unhygienic surroundings acting perhaps on a weakened pelvic floor must be the determining factors

#### SYMPTOMS

The symptoms of prolapse are many and various, but may be conveniently classified as follows.—

(1) *Pain*—(a) “Bearing down” It is difficult to understand the exact nature of this symptom, but patients usually describe it as a pain. (b) *Backache*. This is a very common symptom in the earlier stages of prolapse and is a pain referred to the sacral region, and probably due to muscle strain following upon the efforts of the supporting structures to keep up the affected pelvic organs. That this is a reasonable explanation is shown by the fact that backache is rarely met with in complete prolapse where the supports, so to speak, have given up the struggle. The uterine retroversion frequently associated with prolapse is

not the cause of the backache, and it cannot be too strongly stressed that the back does not ache simply because the uterus happens to be in a backward position. Backache in women is met with just as frequently when the uterus is in its normal forward position. (c) Dragging pain in the lower abdomen or groins due to stretching of the upper attachments of the pelvic organs. (d) Soreness in the vagina in complete cases due to ulceration or infection.

(2) *Presence of a swelling*—"Falling of the womb" is complained of. The patient states that there is a "swelling in the privates" or that "the womb comes right outside."

(3) *Disturbances of micturition*.—This is an important group of symptoms and worth considering in some detail. (a) *Frequency*: The patient is always wanting to pass urine. This is probably the commonest symptom of prolapse in its earlier stages, but may occasionally be due to associated lesions of the bladder. (b) *Urgency or precipitancy*: When the patient wants to pass urine she must go quickly or she wets herself. This is also an important symptom and due to relaxation of the bladder supports. (c) *Difficulty*. Common in the severer types of prolapse and may amount to difficulty in starting the act or inability to pass urine until the prolapsed organs have been pushed up. Difficulty of this kind can be easily understood when it is remembered that in bad cases of cystocele and in cases of complete prolapse a large part of the bladder lies below the level of the urethral orifice. (d) *Diurnal or stress incontinence*. The patient has poor control over her bladder sphincters when going about. Laughing, coughing and sneezing will cause the urine to escape with some force from the urethra, also walking down hill or down stairs or along a rough road. This is not a symptom of true prolapse, although it is complained of in 10 per cent of all cases, but is due to dislocation of the peri-urethral wedge and consequent

hand the catheter literally drops into the bladder as the vesical sphincters are so weak.

Pass a finger into the rectum and note if part of its canal lies within the whole or only part of the prolapsed posterior vaginal wall. A few cases of pure rectocele do occur, but usually the upper part of the swelling contains prolapsed pouch of Douglas and only the lower part, the rectum. The presence of hæmorrhoids, prolapse of the rectal wall or other abnormality affecting the rectum should also be noted during this examination.

Enough has been said to ensure a correct diagnosis of the particular type of prolapse present, and it only remains to mention a few independent lesions having a superficial resemblance to that displacement and also several others which may or may not be associated with it, but are actually responsible for some of the symptoms complained of. A vaginal cyst or a myoma may more or less closely resemble a cystocele, but the passage of a catheter into the bladder will settle the diagnosis.

Bearing down or "something in the passage" may be due to congenital elongation of the cervix without any associated vault prolapse, but in such a case there is no descent of the vaginal fornices on straining.

A swelling in the vaginal canal may also be a fibroid polyp or the fundus in chronic inversion of the uterus, but the fact that these swellings protrude through the cervix and that in the case of inversion the uterine fundus is absent from its normal position can be readily determined by a careful bimanual examination.

Vulvo-vaginitis may sometimes be responsible for a bearing-down sensation which the patient may think is due to prolapse, but the true state of affairs will be apparent on inspection of the vaginal orifice.

Subacute and chronic cystitis may co-exist with genital prolapse and be responsible for some of the urinary symptoms. If this possibility is overlooked the patient will not obtain complete relief from the cure of

her prolapse.

Vesical calculi are rarely met with in women, but occasionally they may be found in patients complaining of great difficulty with micturition. True prolapse may also be present in these cases as a result of the straining efforts to pass urine.

#### TREATMENT

Prevention is better than cure, and, as most cases of prolapse follow definite obstetric injury of the pelvic floor, it ought to be possible to protect this from unnecessary strain during pregnancy, labour, and the involutionary period and so reduce the incidence of this displacement. The following preventive measures suggest themselves.—

*During the ante-natal period.*—Do not allow the pregnant woman to overtire herself during the later months of pregnancy when the uterus is heavy and the pelvic floor structures softened and congested. Treat constipation by appropriate methods. A mixture containing cascara, belladonna and nux vomica taken regularly three times a day is very useful.

*During the intra-natal period* —Discourage the patient from bearing down during the first stage of labour and treat cases of simple delay during this stage with sedatives. Push up the anterior lip of the cervix if nipped by the advancing head. Do not save the perineum at the expense of the important supporting structures about the urethra and bladder neck. Never apply forceps until the cervix is fully dilated. Choose the right time for operative interference, neither too early nor too late. When delivering with forceps be careful to make traction in the direction of the pelvic axis. Carefully repair all lacerations of the perineum and lower part of the vagina.

*During the post-natal period.*—Prevent uterine retroversion by allowing the patient to move freely about in bed after the first two days of the puerperium and by

seeing that the bladder and rectum are emptied regularly. Make a vaginal examination at the end of a fortnight and correct any displacement of the uterus. Make a further examination six weeks after delivery, paying particular attention to the size and position of the uterus and the condition of the pelvic floor. Treat retroversion by replacement and incipient prolapse by the temporary use of a ring pessary for three months. In such cases advise the patient to rest as much as possible until the uterus and pelvic floor structures have returned to normal. It is often forgotten that damaged pelvic supports may recover if given a reasonable chance to do so.

*Curative and palliative treatment.*—When the displacement has become definitely established, treatment will be either curative or palliative, and, unless definitely contra-indicated, the former is always to be preferred. The only way to cure prolapse is by operation, and the operation of choice is colporrhaphy with or without amputation of the cervix. Abdominal operations are unnecessary as different series of statistics have shown that the vaginal method effects a complete cure in 95 per cent. of cases, which is as much as one can expect from any surgical procedure. Colporrhaphy is essentially an operation for the experienced gynaecologist, as no two cases of prolapse are exactly alike, and the amount of tissue removed and other operative details must be adapted to the needs of the particular patient. The complete operation consists of amputation of the cervix, anterior colporrhaphy, and posterior colpo-perineorrhaphy with, in addition, tightening of the urethra and bladder neck in cases of dislocation of the peri-urethral wedge.

Total hysterectomy is unnecessary as part of the routine treatment of prolapse and, in fact, is harmful, as it removes the keystone of the pelvic floor arch. Occasionally the uterus has to be removed for associated lesions, but in these cases the divided cervical attach-

ments of the fibro-muscular supports must be stitched firmly together in the mid-line and a suitable colporrhaphy performed in addition

If properly performed, colporrhaphy should not interfere with sexual or reproductive life, but otherwise dyspareunia or dystocia may result from making the vagina too narrow, altering the direction of its entrance, or amputating too much of the cervix. The experienced operator will bear in mind these possibilities and avoid them whenever possible. The operation is not a serious one, but necessitates the patient remaining in bed for two and a-half weeks. She then takes things very easily for another fortnight and abstains from heavy work for a period of three months. Pregnancy should be avoided until a year has elapsed.

Thus question of pregnancy following colporrhaphy is important, and patients naturally wish to know if they can become pregnant after the operation, if the operation will interfere with labour, and what effect labour will have on the operative result? There is no doubt that any operation involving removal of a considerable part of the cervix will interfere to a certain extent with conception and occasionally be responsible for abortion. Dystocia in a subsequent labour is rare and generally due to cicatrization of the reconstructed cervix or excessive narrowing of the vagina, both of which can be avoided in women likely to become pregnant again. Finally, a woman who has had a colporrhaphy performed is no more and no less likely to develop prolapse than one who has not required such an operation.

Palliative treatment usually consists in the use of some form of pessary, and except as a temporary measure during pregnancy or after labour should only be employed when for medical reasons the patient is considered unfit for any surgical interference. Age, unless extreme, is not a contra-indication, as many women have had a colporrhaphy performed when over

70 years of age and derived much benefit from it. The day of the pessary has now largely disappeared, and very few varieties are to be seen except in the pages of the surgical instrument catalogues. In the treatment of prolapse only two are required, the ordinary rubber watch spring when the patient is able to retain it in position, and the porcelain cup with perineal bands and waist-belt for the others. In some of the very severe cases no pessary is of any use, and then a perineal pad kept firmly in position with a T-bandage may give some relief. The use of pessaries is objectionable from all points of view, and they should only be recommended when surgical treatment is absolutely contra-indicated. They irritate the mucosa of the vagina and cervix, producing foul discharges and perhaps ulceration, and if neglected may lead to fistula formation or predispose to vaginal carcinoma. Patients wearing pessaries should be instructed to douche daily with a weak antiseptic (one drachm of borax to the pint of warm water does quite well) and to have the pessary re-fitted or changed every three months. Prolapse rarely gives rise to trouble during pregnancy, but occasionally the symptoms are aggravated and it is necessary to insert a ring pessary of suitable size to be worn until the end of the fifth month.

Prolapse of the rectum comes within the province of the general surgeon, but I have seen a very extensive one associated with a complete perineal tear and procidentia. This case was treated successfully by the routine method referred to above, together with excision of a triangular area of the anterior rectal wall. Acute prolapse of the urethra sometimes occurs in elderly women. The condition has to be distinguished from a urethral caruncle or carcinoma, but this is usually quite easy, as the urethral opening lies in the centre of the protuberant mass. Treatment consists in excising the prolapsed ring of mucous membrane.

# Some Mechanical Aspects of the Pelvis in Clinical Obstetrics and Gynæcology

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THERE is no doubt that the mechanical functions of the female pelvis are becoming of increasing interest to the practitioner in these days of easy transport, lifts and other contrivances invented to reduce the natural exercise of man. The object of this article is to lay stress on the importance of the abdominal and pelvic muscles at special times, during pregnancy, in the puerperium, after abdominal operations, and also of the mobile joints situated around the pelvic girdle, such as those of the lower lumbar and sacral vertebræ and of the sacro-iliac joints themselves.

Low back pain is such a prominent feature to-day that examination of the bony pelvis should not be forgotten when the gynæcologist's investigation is carried out. Quite often a case may be referred to the gynæcological department for an opinion which may simply state after examination "per vaginam all normal," when a chronic sacro-iliac strain following a labour with subinvolution may be entirely missed, and the patient told that the uterus is in good position and everything quite satisfactory. Meanwhile the backache continues and the patient then makes caustic remarks on the skill of the medical profession, especially after she has drifted to an osteopath who, with one or two simple manipulations, has cured her



pain.

#### SACRO-ILIAE JOINTS AND LOWER VERTEBRAL JOINTS

The lower lumbar region and the sacro-iliac joints have long been a veritable gold mine to the osteopathic fraternity. Only recently has the medical profession been taking serious notice of these joints and of the frequent disarrangement of their peace and harmony, as will be evidenced by the very scanty attention devoted to them in even some of the most up-to-date textbooks of orthopædic surgery. J. B. Mennell, in his short, clear book on "Backache,"<sup>1</sup> and more succinctly in an article in these columns,<sup>2</sup> has made the investigation and diagnosis of troubles in this neighbourhood much more simply and clearly understood. So important is the mastery of it that every practitioner should have a simple method of examination of this region at his finger tips.

At the Congress of Obstetrics and Gynæcology, which took place in 1931 at Glasgow, after an introduction by James Young, there was a discussion on the importance of low back pain in gynæcology, where this pain was not referred as due to any visceral disease but was dependent upon an accompanying orthopædic lesion in the lower spine. Readers would be wise to consult the paper of James Young and W. A. Cochrane at this Congress.<sup>3</sup>

It is often more prudent not to operate in order to relieve backache in women, even when gynæcological disorders are present, until the lower lumbar-vertebral joints, and certainly the sacro-iliac, have been put through their full range of movements. Most orthopædic surgeons do this without an anæsthetic, which is a great advantage and is always the method, of course, of the osteopath, who practically never has anæsthetic given and so can better test the reaction of patient to the movements of their joints. There is considerable movement of these joints

is evident to any observer who has either dissected them in the female cadaver, or who has scrutinized X-ray photographs of the pelvis during the last weeks of pregnancy, or who has himself carefully examined in various positions a woman's pelvis before labour.

One writer has said that at full term there is two and a half times the degree of movement at the sacro-iliac joints that there is in a non-pregnant woman, the range increasing from the fourth month onwards. In cases coming to the post-mortem room at this time the anterior margins of the joints have been able to be separated as much as a quarter of an inch.

One important point is that when we speak of "involution" we often refer to the soft parts only, the uterus, the adnexa and the vagina, but this term should include the pelvic joints and ligaments, which are of great importance. At eight weeks after delivery these are still lax and it usually takes three to four months for them to regain their stability.

For these reasons it has often been found to be unwise to encourage patients to get out of bed and to walk too soon. Frequently this has been practised by obstetricians, on the plea that labour being a physiological process, the patient should resume normal life as soon as possible. These, however, had not reckoned on the advances and attendant difficulties of civilization until the results showed themselves in backache and pelvic discomfort following in the wake of this too rapid activity. A patient may be kept moving as much as possible after delivery in bed, and be encouraged to do exercises and to move her limbs and joints, but she should be given as long a rest in bed as can be spared, so that she then will be fit and strong and free from chances of supervening backache when she assumes the erect attitude. If this condition attains in a normal case, how much more care must be taken when involution is delayed as in some forms of puerperal sepsis when long lasting

changes may eventuate from over early activity. At first the patient gets about, then a relapse occurs, then gradually she shows symptoms of disordered functions of the joints, the discomforts of which are at first relieved in the supine position, and then the condition progresses until secondary arthritic changes are produced in the joints

In delayed involution cases there may be greater freedom of movement at the pelvic joints than in a normal woman at this time; therefore how much more care should be taken where there has been a difficult labour with much moulding of the foetal head and possible over-stretching of the anterior sacro-iliac ligaments, leading either to traumatic arthritis or even a partial subluxation. Treatment, then, must be on the lines of prevention, and afterwards of a thorough examination and manipulation with the necessary corrective procedures

This article is only meant briefly to indicate the importance of these cases and to insist on greater collaboration between the gynæcologist and the orthopaedist. The importance of these causes of low back pain cannot be over emphasized, and the gynæcologist would be wise to have the experience derived from testing the mobility of these pelvic joints in many cases before he undertakes his operation for vaginal prolapse, uterine displacement and other pelvic conditions. A great deal of work has yet to be done in this field. X-ray examination is often not sufficient in such cases, a thorough physical examination being all important.

#### THE MUSCLES ATTACHED TO THE FEMALE PELVIS ABDOMINAL AND PELVIC FLOOR GROUP

*The use of the abdominal muscles during pregnancy.*—There will always be minor discomforts in pregnancy, but many may be obviated by attention to diet, hygiene and the general management of the pregnancy. Again, many of the mechanical discomforts may be

relieved in the early months by abdominal exercises of a simple kind and also by massage. Properly conducted massage and movement can do much to alleviate the night cramps in the legs. In any big series of cases seen through the ante-natal period the medical attendant always finds that those women who are fond of walking, who do not sit about in motor cars, and who are keen on exercise throughout as many of the forty weeks as they can comfortably manage, are the healthiest and give rise to the least anxiety at their labour and during the puerperium. The swelling of the feet that occurs at the end of pregnancy, when not caused by œdema due to cardiac or kidney conditions, is greatly helped by suitable exercise and massage. Finally, the discomfort and real backache which so many get when the ligaments round the sacro-iliac joints soften may be considerably helped by suitable movements and manipulation of those joints. Walking without doubt and the proper use of the abdominal muscles is of enormous help throughout the pregnancy.

*After the confinement*—It seems unreasonable that after women have been encouraged during the pregnancy to take plenty of exercise, plenty of walking, to get up and down stairs, in short to use their muscles and joints as much and as freely as they possibly can with comfort, that then they should be left to lie in bed for three weeks. In this way their overstretched abdominal muscles, which are compressed by a useless binder, have no chance of recovery, while they themselves are usually ministered to hand and foot by the nurse who anticipates their every need. Small wonder is it that the bladder and bowel give trouble, that the circulation becomes sluggish and the uterus fails to drain properly, causing various attendant troubles. After three weeks of this enforced muscular lethargy the patient is supposed to get up, and with the abdominal and pelvic muscles in such a weakened

state, uterine displacement, enteroptosis, bowel distension and other such troubles often ensue

Attempts every now and then have been made by enthusiasts who claim that labour is on physiological lines, and who insist that the patient should be made to get up on the third or fourth day. This in civilized countries has been proved to be entirely a mistake, and has been mentioned previously in connection with the involution of the sacro-iliac joints, which does not take place for some time and indicates that the full weight of the body in the erect attitude should not be super-imposed on these important structures.

Results have shown that quite three weeks' rest in bed is advisable especially for city dwellers, though the big maternity hospitals cannot spare their already overcrowded accommodation usually for more than ten, twelve or fourteen days; but with this rest, exercises and movements while in bed are all important.

It is all important that the mother, after forty weeks of pregnancy with its many attendant discomforts, should enjoy to the full the first three weeks of her puerperium, which often should be some of the happiest of her life. Those mothers who have been given and who have performed a graduated series of exercises and movements, bear witness to increased efficiency, greater comfort and well-being, and when they get up they are markedly stronger than their inert sisters. It is not enough just to have a masseuse, however skilled, who does all the work for the patient; this is certainly pleasant and luxurious, but the exercises are the first essential and should start right away from when the patient has had her first good sleep. Only ten minutes to a quarter of an hour need be given up each day, and these movements need not be a drudgery. At first these work through from posture in order to improve drainage of the uterus,

to breathing exercises, blowing the abdomen in and out, exercising the leg muscles, contracting the levator ani muscle, tilting up the pelvis and rolling from side to side. In this way, by the end of a fortnight, all the muscles in the body are being exercised by natural movements which aid the organs of excretion and promote involution. Often no harm is done in normal cases in letting the patient use the commode from the second or third day, for which she may be allowed out of bed with the assistance of the nurse. When she gets up about the sixteenth, eighteenth to twenty-first day she should be shown four or five simple exercises for using the abdominal and pelvic muscles and should be encouraged to continue doing these. If, when up, any pain develops in the lower part of the back and the joints are not moving comfortably, it is wise to have a few manipulations done to put these articulations through their full range of movements, after which the patient may return to her ordinary life.

*After abdominal operations* —Much the same happens after abdominal operations, previous to which the patient has been leading a normal active life. She then undergoes abdominal section, and is kept in bed and has everything done for her for three weeks. Is it at all surprising that her organs do not function smoothly? Many surgeons are familiar with the type of patient that gives post-operative anxiety, has the worst distension, the most pain and nausea, the most trouble with her bowel and bladder, and possibly later tends to thrombosis and, perhaps, embolism. Quite often it is the nervous patient who is terrified of moving hand or limb, who is propped up in the Fowler position with the knees well flexed on the abdomen and rings her bell for the nurse day and night.

Patients, after an abdominal operation in order to avoid these troubles, should have a progressive series of movements and exercises mapped out for

them day by day. It is not enough to say you wish them to keep moving their arms and legs, instructions should be written down or typed out in detail, and should be of the simplest kind. If this is done and a masseuse can be afforded, these patients are much stronger when they get up. Their organs then function more normally and are maintained in better position. In these difficult days expenses have to be cut down in every direction, so only the fortunate few can afford massage after operations and confinements, but all can easily follow a simple programme of movements and exercises, so that when they face the world once more, the skeletal system of bones, joints and muscles is better able to cope with the strain of modern life.

The question is who should demonstrate these exercises? Does it mean the nurse or midwife or a special instructress? Only for those few who can afford it, as the nurse has quite enough to do as it is, and the mother should make no further claims upon her. The simple table of movements and exercises should be handed to the mother to carry out herself. It is often the fault of so many methods of exercises and their demonstrators that too complicated movements are given. The proof of their failure is that as soon as the teacher's back is turned, nothing more is done, whereas if five or six simple exercises are thoroughly explained, there is a chance that these may be persisted in for some time to come with considerable benefit to the patient.

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# The Early Diagnosis and Treatment of Pregnancy Toxæmia

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THE toxæmias of pregnancy may be divided into two main groups: (1) comprising albuminuric toxæmia, pre-eclampsia, and eclampsia; and (2) hyperemesis. The term albuminuric toxæmia draws attention to the fact that in this type the chief damage in early cases is renal; but the stress laid on the urinary abnormality has led to the neglect of other signs and symptoms, which sometimes enable toxæmia to be diagnosed before albuminuria has occurred, and which are of more assistance in estimating progress and prognosis. In both eclampsia and toxic hyperemesis degenerative changes are found in the liver, and the changes found differ in the two diseases. Albuminuric toxæmia may progress through pre-eclampsia to eclampsia, further stages of the same disease. Hyperemesis appears to be a distinct entity.

## ALBUMINURIC TOXÆMIA

This is generally considered to occur in from 3 to 5 per cent. of women who were apparently normal before pregnancy; and one of the important objects of ante-natal care is its early detection and treatment. The dangers of this pregnancy toxæmia can be grouped under three headings: (1) eclampsia; (2) permanent renal damage; (3) death of the foetus. From these we can select the mortality from eclampsia as a test by which to measure the ante-natal work which is being done throughout the country. Examination of the



Registrar General's reports shows that the death-rate, per 1,000 births, from "puerperal albuminuria and convulsions" has not decreased; in the last ten years the mortality has, in fact, slightly increased. Since there has been a great increase in the number of ante-natal clinics, and the amount of ante-natal care, in the same period, it is evident that toxæmia is not being diagnosed early enough to prevent eclampsia.

The Maternal Mortality Committee in its interim report expressed the opinion that: "Apart from the cases of fulminating eclampsia which may occasionally occur either before or after delivery within a short time after a normal blood pressure reading and urine test, eclampsia is almost entirely a preventable disease." I have examined the case sheets of eighteen recent cases of eclampsia in order to find out how many could have been prevented. The series consists of consecutive cases admitted to hospital at the request of a general practitioner or from the hospital maternity district. In eight cases symptoms of toxæmia began one month or more, and in seven cases one or two weeks before the onset of fits. In three cases the onset was rapid and the patient was probably normal two or three days before the fits occurred. There was no case of true fulminating eclampsia of the type referred to by the Maternal Mortality Committee. Fifteen of the patients could have been diagnosed as toxæmic, by efficient ante-natal supervision. In the other three cases eclampsia might possibly have been prevented if the patient had come for examination when she began to feel ill, and if immediate treatment had been undertaken.

*Symptoms of toxæmia.*—These may be divided into two groups (1) early symptoms of mild toxæmia, increasing very gradually in severity; (2) pre-eclamptic symptoms, the onset of which precedes the fits by only a few hours, or at most a few days. In order to prevent eclampsia the toxæmia must be detected in the first stage, in the second stage it may not be possible to

start treatment soon enough, unless the patient is already in hospital. The first stage of the toxæmia is also important from the point of view of prevention of chronic nephritis and intra-uterine death of the foetus. A prolonged toxæmia is more likely to produce permanent renal damage than is eclampsia of very rapid onset; and the foetus may be killed by a toxæmia in which the mother was never threatened with eclampsia.

*Œdema* is the most important early symptom. In cases of severe toxæmia it is common to find that there is a long history of œdema preceding the more severe symptoms which finally drew attention to the disease. Among the eighteen cases mentioned above I find that œdema was present at the onset of symptoms in thirteen, and preceded all other symptoms in nine of these. It is absent only when the onset of toxæmia is rapid. The œdema probably starts in the feet and legs and is then too often regarded as almost physiological, due to pressure by the enlarging uterus. Definite œdema of the legs, in spite of its apparent postural origin, may be due to toxæmia, and the patient should be seen frequently, and a careful watch should be kept for albuminuria and rise of blood pressure. Generalized œdema, shown by swelling of the face and hands, is a more definite sign of toxæmia. It is important even when only of slight degree, and is usually a symptom complained of by the patient, rather than a sign noticed by the practitioner. The most important type of œdema is that which gradually spreads up the thighs and on to the abdominal wall; at the same time slight swelling will usually be noticed in the hands and face. This spreading œdema is a common sign of the pre-eclamptic state. I have noticed it especially in toxæmic patients during labour. Such patients require careful treatment to prevent intra-partum and post-partum eclampsia.

*Headache* is a later symptom. If it is due to toxæmia it does not precede the development of albuminuria and the rise of blood pressure by more than about two

weeks as a rule. Patients who have had headaches longer than this usually admit, when carefully questioned, that they have had them throughout pregnancy or longer, and the headache can then be classed as migrainous. *Visual disturbances* are also a late sign. I do not find "spots in front of the eyes" or "flashes of light" of much value as a sign of mild toxæmia, but disturbances of vision are very important in pre-eclampsia. Partial or complete blindness very commonly comes on an hour or two before the first fit, and calls for immediate drastic treatment of the toxæmia, if eclampsia is to be prevented. The rapid onset of severe headache has a similar significance, and epigastric pain, in conjunction with other symptoms or signs, often precedes convulsions.

*Physical signs of toxæmia* — Œdema has been included among symptoms because it begins gradually and, especially on the face and hands, may be more obvious to the patient than to the practitioner. There is no doubt that *rise of blood pressure* is the most important sign of toxæmia. Attention has recently been drawn to its importance by Professor F. J. Browne. He found that rise in blood pressure preceded albuminuria in 13 cases out of 48, by periods ranging from 11 to 89 days. In the other 35 patients albuminuria and rise of blood pressure were discovered at the same time. Routine blood pressure estimations should be made at intervals throughout pregnancy and the results interpreted in relation to the symptoms and other signs. Browne recommended that the patient should be seen every month till the thirtieth week, then fortnightly till the thirty-sixth week, and weekly after that till delivery. This may seem too much to ask, but it is only by routine examination in all cases that we can hope to detect early toxæmia. If the blood pressure cannot be taken as a routine, it should at least be taken when there are any symptoms which may be toxæmic, and if albuminuria is present, the degree of rise in blood pressure

gives a valuable indication of the severity of the disease.

Any rise in blood pressure over 140 mm Hg should be regarded as probably toxæmic in origin. In patients of 35 years of age or more such a blood pressure may be normal, but this can be decided only by correlation with the other signs and symptoms, and by seeing the patient weekly for a time, if no indication is found for urgent treatment. A rise of blood pressure to 160 mm. Hg or more, especially if it has occurred in a short time, is an urgent indication for treatment.

*Albuminuria* occasionally occurs as the first sign; but this is very uncommon in a true pregnancy toxæmia. It is more likely to occur early in chronic nephritis, and may then of course have been present before pregnancy. In pre-eclampsia the amount of albumen in the urine rapidly increases.

It must be emphasized that all symptoms and signs must be taken into account in deciding whether toxæmia is present, and what treatment shall be given. A slight rise of blood pressure combined with moderate œdema and headache, or one of these and slight albuminuria, is of much more significance than a symptomless rise of blood pressure of greater degree. A patient is sometimes found to have a blood pressure of 160 mm Hg or more, and may go through pregnancy and labour successfully, never showing any other abnormality. She must then be regarded as a case of hyperpiesis with no toxæmia or nephritis. On the other hand, a patient may have eclamptic fits with a blood pressure of only 155 mm Hg. A single symptom or sign occurring alone is an indication for investigation and observation, but does not usually require much treatment.

*Ante-partum hæmorrhage* is an occasional consequence of toxæmia, and may be included among the symptoms and signs. It is usually associated with extensive placental infarction which ultimately causes the death of the foetus. It has been noted in eclampsia—but as a rule a toxæmia which leads to ante-partum hæmorrhage

does not cause eclampsia

Chronic nephritis is sometimes included in a discussion of pregnancy toxæmia. Definite nephritis with cardio-vascular changes and signs of renal deficiency, which were known to be present before pregnancy, is an indication for immediate termination of pregnancy. Recurrent toxæmia may possibly be due to a slight degree of renal damage which only shows under the strain of pregnancy. This can only be proved by continued observation after pregnancy has terminated; slight degrees of nephritis are difficult to diagnose during pregnancy, and doubtful cases should be treated as pregnancy toxæmia.

*Treatment.*—The origin and nature of the toxin responsible for this disease are unknown. We can terminate the toxæmia by terminating the pregnancy, but there is usually no abnormality in the ovum which can be regarded as a cause of toxæmia. There is very little evidence in favour of alimentary toxæmia as a primary cause, and it is difficult to believe that a condition peculiar to pregnancy can be due to alimentary disturbance. We know, however, that in early cases the main damage done by the toxin is renal. Treatment must therefore endeavour to diminish the work done by the kidney, in order to give it every chance to deal with the toxin; and pregnancy must be terminated before the kidney suffers permanent damage, and before the toxin has killed the foetus, or injured the liver.

*Rest in bed* is the most important part of all methods of treatment. A mild toxæmia may clear up with complete rest in bed, and very little treatment beyond that. More severe toxæmias usually show a temporary improvement only. Chronic nephritis may develop after mild toxæmia, or the mild toxæmia may develop into severe toxæmia which can only be terminated by emptying the uterus. All mild cases must therefore be treated by complete rest at a time when treatment

has its greatest effect. The patient must stay in bed till the signs of toxæmia disappear, and the blood pressure and urine are normal. This does not commonly occur before delivery, except when treatment is undertaken in the very early stages; therefore, most patients with definite toxæmia of pregnancy must stay in bed till delivery.

Diet is usually considered to be of equal importance with rest, but it is difficult to be certain whether it has such a great effect on the progress of the patient. The diet may be restricted (1) to give rest to the kidney, (2) to prevent the production of a hypothetical toxin in the alimentary canal, (3) to decrease the production of acid, and increase the production of alkaline substances in the body, (4) to decrease the ingestion of salts. The first reason is definitely founded on the fact that the kidney suffers first and most severely in toxæmias which do not progress as far as eclampsia. The second reason is theoretical, but a diet which satisfies the first reason will also probably eliminate the foods supposed to produce the toxin. The third reason depends on the researches of Osman and Close who found that an alkali-producing diet and administration of large quantities of alkalis produced improvement in cases of albuminuric toxæmia of pregnancy; similar treatment having already been found to decrease the incidence of nephritis in scarlet fever. Both types of diet are essentially low-protein diets. The patient should not take meat, fish, eggs, or meat extracts. Bread, and cereals generally, should be taken sparingly. She may have two pints of milk daily, with milk puddings and potatoes. Fruit, stewed or raw, and salads may be taken, and are beneficial because they increase the volume of the food. The patient should be encouraged to drink large quantities of fluids, water, lemonade, or barley water. Lemonade made with glucose is the best drink, because its caloric value is high. If the diet is kept too low she may be

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living on her own tissues. Cocoa and weak coffee or tea may be taken in small quantity, and the total amount of fluid should be 4 or 5 pints daily. Sugar also tends to counteract the acidosis which is a danger whenever diet is restricted.

It may not be found possible to keep a patient on such a low diet for longer than about ten days. If improvement takes place, a small amount of fish and an egg may be added; but meat must be avoided for the rest of pregnancy even if the toxæmia clears up completely.

*Elimination of the toxin* is the theoretical object of some forms of treatment. Whether it achieves this object or not, diuresis is to be encouraged by the administration to large amounts of fluid, because it certainly appears to lead to improvement, and to diminution of the toxæmia. Diaphoresis may be encouraged by hot-water bottles and blankets, but it is doubtful whether any good results from increased sweating. The patient should, however, be kept warm; and in the more severe toxæmias it is better that she should lie between blankets. Purgatives should also be given, in order to produce one or two motions daily. Magnesium or sodium sulphate in doses of one to three drachms daily are the most satisfactory.

*Drugs* are of very little use in treatment. Alkalis may be given, as in Osman and Close's treatment of nephritis. Potassium citrate and sodium bicarbonate are given two or four hourly, in doses up to a total of 400 grains daily or sometimes more, the object being to keep the urine continually alkaline. If this treatment is to be any good it requires frequent determinations of the exact degree of alkalinity of the urine. In favourable cases diuresis takes place and toxæmia diminishes, but it is too soon to give any final opinion on this treatment.

In the presence of more severe toxæmia, as shown by a blood pressure of 160 mm Hg or over, and symptoms of pre-eclampsia, the treatment must be more drastic than that which has just been described. No solid

food should be given by the mouth, but glucose lemonade and barley water should be taken freely. If the blood pressure rises and symptoms increase in severity the pregnancy must be terminated at once

*Duration of conservative treatment*—It is now generally accepted that albuminuric toxæmia is likely to lead to permanent renal damage if it is allowed to continue longer than about two weeks. This period is a reasonable test of the treatment, and pregnancy should be terminated if the patient shows no improvement at the end of that time. If improvement is occurring the period of conservative treatment may be extended if the foetus is small, but there is little to be gained by prolonged dietetic treatment when the pregnancy has reached 36 weeks. During treatment a careful watch must be kept for increase of headache, visual disturbances, and œdema, and the blood pressure must be taken twice daily, because it is the safest guide to the patient's condition. A blood pressure remaining at 160 mm. Hg or over, in spite of treatment for three or four days, and a blood pressure rising above this level in spite of treatment, are indications for immediate termination of pregnancy. Patients with persistent symptomless high-tension, and no albuminuria, must be carefully distinguished from those where the rise of blood pressure is due to toxæmia. In the presence of severe toxæmia delay is of no advantage to the foetus, which is more likely to die in utero from toxæmia than after birth from prematurity.

*Termination of pregnancy.*—The two methods most commonly used are bougie induction, and rupture of the membranes. If labour does not come on castor oil may be given, and an enema, as in an ordinary drug induction, and supplemented by hourly injections of pitocin in two-unit doses up to a total of ten units. When pains come on it is dangerous to continue giving pitocin. Pituitrin should not be used because it raises the blood pressure. Drug induction without previous

instrumental induction is useless unless the patient is at or near term, when it may be tried before resorting to bougie induction. The foetal mortality during labour is high because the placenta often contains infarcts before labour, and the foetus dies of asphyxia before delivery. Cæsarean section may therefore be considered when the mother is elderly, and when a previous foetus has been lost from toxæmia and the mother has no living child. If chronic nephritis is diagnosed Cæsarean section is the best method because sterilization is indicated. In pregnancy toxæmia there is no indication for sterilization.

Following delivery the patient should be advised not to become pregnant for at least two years, in order that the kidney may have opportunity for complete recovery. There will then be less likelihood of a recurrent toxæmia, and renal function tests can be performed to exclude the possibility of nephritis, before the next pregnancy.

#### HYPEREMESIS GRAVIDARUM

This is a rare disease compared with the albuminuric toxæmia which has been dealt with in preceding pages. It is commonly divided into neurotic and toxic types, but it seems probable that the one really develops into the other, and it is possible that the "normal" early morning vomiting of pregnancy may be toxic in origin. True toxic hyperemesis is a very serious and fatal condition, in which termination of the pregnancy is nearly always necessary. Its progress is so insidious that the decision to empty the uterus may not be made early enough to save the patient's life. It usually occurs between the second and fifth months of pregnancy, and begins with morning vomiting, which gradually becomes more severe till the patient cannot keep any food down. The first definite indication that condition is toxic will be failure of nutrition—the patient becomes thinner. At the same time there is a

diminution in the output of urine; this is the first evidence of dehydration. The vomiting may not appear severe, but the condition of the patient gradually deteriorates. Her complexion alters and jaundice appears; bile may be found in the urine. In the last stages of the disease the pulse rate rises, and albumen is found in the urine. The blood pressure is usually low throughout.

The patient should be treated by isolation and starvation to a degree which depends on the severity of the disease. In definitely toxic cases it is necessary to stop all feeding by the mouth, and give enemata, or continuous rectal saline, containing 5 per cent. glucose. Glucose solution may also be given intravenously. Bromides may be added to the enemata. After twenty-four to forty-eight hours a little water may be given by the mouth, and the patient may eat small portions of lettuce or fruit. The output of urine, the intake of fluids, and the amount vomited must be measured daily. If the urinary output remains small, and the clinical condition of the patient does not improve, therapeutic abortion must be carried out, even if very little vomiting is occurring. The most useful signs of toxæmia are diminished output of urine, the presence of bile in the urine, and jaundice. Albuminuria often occurs too late to be of any value in diagnosis. Abdominal hysterotomy is the best method by which to terminate pregnancy, induction is too slow, and vaginal hysterotomy may cause profuse bleeding and shock. If pregnancy is terminated too late, the toxæmia may continue, and the patient may die a week or more after the uterus has been emptied.

# The Management of Cases of Abortion

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ABORTION is one of the most important of the common emergencies of general practice and few medical men have been fortunate enough to escape anxieties about these cases. Most patients with abortion are treated by the general practitioner who, for the successful management of the average case, depends upon his skill in diagnosis, his judgment and the therapeutic measures under his control. If treatment is to be satisfactory, some of the complications of abortion demand early recognition, and when these occur, for example septic abortion, the practitioner's responsibilities are heavy. The object of this communication is to direct attention to some of the important clinical problems arising in the management of cases of abortion. It is not intended to discuss here the question of the causation of abortion in detail, as it is my experience that erroneous impressions are frequently obtained from women who are determined to conceal the criminal nature of their case. Repeated abortion belongs to a different category, for it often leads to extreme unhappiness.

*Repeated abortion*—Such cases are not uncommon and, in some, the cause can be recognized and rectified. It is important to remember that syphilis causes abortion after the 20th week of pregnancy; and that repeated abortion in early pregnancy is not due to syphilis. Congenital retroflexion of the uterus and small fibroids, which are sometimes responsible, are easily dealt with by operation. One of the commonest causes

is ill-development of the uterus and the associated syndrome of hypoplasia genitalis, the late onset of puberty, irregular, scanty and painful menstruation, taken in conjunction with a palpably small uterus lead to the diagnosis. Such patients frequently abort three or four times and then go to term with subsequent pregnancies. Simple dilatation of the cervix often helps these patients and, in a fair percentage of cases, the ensuing pregnancy proceeds to term. The method is far from being a certain cure, but it should always be employed in cases of this type. On theoretical grounds the administration of ovarian extracts, such as progynon, menformon, theelin and sistomensin should be recommended prior to pregnancy and active corpus luteum extracts or the prolan preparations during the early weeks of pregnancy. Many gynaecologists have claimed good results from organotherapy of this kind, but in my hands the results have been disappointing, and it is clear that further work is required before therapy along these lines can confidently be recommended.

In another group of cases repeated miscarriage follows a difficult instrumental delivery during which the cervix and perhaps also the lower uterine segment have been lacerated. Repair of the cervix is indicated in cases of this group. Similarly, curettage should always be advised in those cases which follow labours complicated by morbidly adherent placenta or subsequent puerperal sepsis. Rare causes of repeated miscarriage are the congenital split pelvis and spina bifida occulta.

In a fair proportion of cases no cause for the repeated miscarriage can be found: nevertheless, dilatation of the cervix should be recommended. Though admittedly empirical, the treatment is sometimes successful and success means a great deal to patients of this type. Medical men are often asked to give a prognosis in cases of repeated miscarriage. It is extremely rare

to see patients of menopausal age whose pregnancies have all terminated in miscarriage; consequently there are not any grounds for too gloomy a prognosis except in the very rare unfavourable cases of split pelvis and spina bifida occulta.

*Threatened abortion.*—In all cases of abortion much depends upon accurate diagnosis; indeed, without very great precision in diagnosis it is rash to give a prognosis, and treatment approaches empiricism. In cases of suspected threatened abortion it is first necessary to establish the presence of intra-uterine pregnancy. The most dangerous mistake to make is to confuse ectopic gestation with threatened abortion, and it is my experience that this error is made much more frequently than is generally believed. With ectopic gestation violent abdominal pain is the main symptom, it is true that in cases of tubal mole the pain is intermittent and colicky, but even then it is much more severe than the pain of threatened abortion. Again, in ectopic gestation the vaginal hæmorrhage when present is slight in amount, often of the nature of a coagulated brown discharge, the passage of bright red blood or of clots is very much contrary to the usual findings of ectopic gestation. It is, again, not uncommon for the decidual cast of ectopic gestation cases to be mistaken for an ovum or placenta. A decidual cast is never infiltrated with blood or clot, it is white and thick, with a smooth inner surface. In all cases the material passed must be examined carefully; the presence of a foetus in the discharge proves the pregnancy to have been uterine.

The pelvic physical signs of threatened abortion are those of intra-uterine pregnancy combined with vaginal hæmorrhage. Dilatation of the cervix is hardly ever found in cases of threatened abortion, when present, it suggests that the abortion is becoming inevitable. Care must be taken to distinguish between the multiparous cervix and a cervix which is dilating during the

evacuation of the uterus.

Vaginal hæmorrhage in early uterine pregnancy may be caused by mucous polypus of the cervix and by vascular erosions. In such cases the bleeding often follows coitus. Carcinoma of the cervix is rarely seen in early pregnancy; it is characterized by severe bleeding on vaginal examination. All these three causes can be diagnosed with precision only by speculum examination of the cervix. The importance of speculum examination of the cervix in cases of suspected threatened abortion cannot be overstated.

Few advances have been made in the *treatment* of threatened abortion. Absolute rest in bed is essential, purging is contra-indicated. Sedatives should be freely administered; personally, I use small doses of morphia or omnopon. The use of corpus luteum extracts has been advocated by some authorities; it should be remembered that few marketed preparations of the corpus luteum have a demonstrable pharmacological effect when given by mouth, and, personally, I have had no success with this method of treatment. Small doses of ergot, e.g. minims 3 of ernutin given three times a day have seemed to me to be helpful. The theoretical reason for this treatment is perhaps open to severe criticism, for it supposes that mild contractions of the uterus are induced, which are sufficient to control hæmorrhage, but insufficient to cause strong contractions of the uterus. It is difficult to assess how much such measures help in these cases, for the symptoms of threatened abortion often subside as the result of simple rest in bed and the administration of morphia.

Vaginal hæmorrhage at the times of the suppressed periods develops fairly frequently in early pregnancy and is usually regarded as a sign of threatened abortion. There is no method of distinguishing between the two conditions, and for this reason it is customary in cases of habitual abortion to keep the patient in



bed at the times of the suppressed periods.

*Missed abortion.*—The term “missed abortion” is used somewhat loosely at the present day. In cases of missed abortion the ovum dies early in pregnancy, usually about the 10th week, and instead of being expelled, remains adherent to the wall of the uterus. Slight hæmorrhage occurs at the time of the death of the ovum, the bleeding then stops and a long period of amenorrhœa follows, during which the uterus does not enlarge and the symptoms of pregnancy subside. The period of amenorrhœa may last a long time—as much as two years—then a brown discharge develops, and finally a carneous mole is passed. The important point is that the uterus always empties itself spontaneously in due course. Missed abortion is a rare complication of pregnancy. At St. Bartholomew’s Hospital we have a large number of abortion cases, but missed abortion cases form only about 1 per cent. of the abortion admissions.

The diagnosis of missed abortion is simple if the classical history is obtained. A number of cases may present difficulty. For example, a complete abortion may have followed the initial hæmorrhage and the patient becoming pregnant again, the uterus is found enlarged. Again, the subinvolted multiparous uterus may give rise to difficulty, but in such cases amenorrhœa is very exceptional.

In cases of missed abortion the patient usually insists upon evacuation of the uterus. The only exception I can recall was with a sophisticated woman who thought missed abortion seemed a very satisfactory method of birth control! The simplest method of evacuation is to insert three or four laminaria tents into the cervical canal; abortion usually follows within 36 hours

An alternative method is to insert a small hydrostatic bag into the lower uterine segment after preliminary dilatation. Both methods are to be preferred

to immediate evacuation, for with them the complications, shock and hæmorrhage, are rare. Tents are sterilized by dry heat and are now used more often than a few years ago.

*Inevitable abortion.*—With this the severity of the bleeding, the dilatation of the cervix, and the presence of some part of the ovum within reach of the examining finger placed either in the vagina or in the cervical canal, allow the diagnosis to be made without difficulty. The majority of cases of abortion terminate spontaneously without complication and the cardinal rule of treatment of abortion cases is not to interfere unless there are well-defined indications to do so. These indications are: (1) Hæmorrhage, (2) sepsis, and, very rarely, (3) the development of chorion-epithelioma.

*Hæmorrhage* is the commonest complication. It may assume one of three clinical forms: (a) Hæmorrhage during the passage of the ovum; (b) hæmorrhage due to retained products; (c) uterine hæmorrhage following complete evacuation of the uterus.

(a) Severe bleeding may accompany the passage of the ovum and very rapidly the woman may be reduced to a desperate state of anæmia. It is this type of case which causes the practitioner the greatest anxiety, for he has to decide whether the uterus must be emptied by operation and, more important still, he must decide whether the anæmia and shock are of a degree to contra-indicate this measure. In spite of the relative frequency with which such cases are seen the mortality from hæmorrhage is very small. In the last eight years we have had approximately 500 abortion cases at St. Bartholomew's Hospital, but there has been no death from hæmorrhage. There are two points to grasp: the first is that the hæmorrhage is usually spontaneously controlled in cases of this type, the second is that if a woman is anæsthetized when in this state of shock and the uterus perhaps

rather vigorously evacuated, then fatalities may occur. In most cases the hæmorrhage is controlled by the administration of pituitrin and further interference is unnecessary. If the hæmorrhage persists and it is decided to empty the uterus, the correct procedure in cases in which the bleeding has been severe is first to transfuse the patient and then to perform evacuation. To attempt this measure prior to transfusion when the woman is shocked and anæmic should be regarded as a serious error of judgment. If transfusion is not possible it is safer to treat shock with warmth and fluids and to induce uterine contractions with pituitrin.

(b) *Hæmorrhage due to retained products of conception* This complication is frequently seen and it gives rise to persistent bleeding which may be prolonged for as long as three or four weeks. Usually either part or the whole of the placenta is retained and often a clear history is given of the passage of the embryo alone. In most cases the physical signs are simple; the cervix is dilated to admit one or two fingers and the retained products of conception lie within reach of the examining finger. The bleeding is usually profuse, the uterus is soft and enlarged, and its shape is globular with a marked increase in its antero-posterior diameter.

The treatment of cases of this type consists in evacuation of the uterus. Personally, I prefer to treat these patients conservatively with pituitrin for 24 hours if institutional facilities are available. Intramuscular injections of 10 units are given four-hourly to a maximum of six doses, and in a large percentage of cases spontaneous evacuation of the uterus follows. The reason for this conservative treatment is that cases are seen from time to time in which latent sepsis has been lighted up by digital evacuation of the uterus and fatal septicæmia has followed. The method is not advised if the woman is in her own

home, and clearly in cases of severe hæmorrhage preliminary transfusion followed by evacuation is the correct procedure. There are some important points to be remembered in the technique of evacuation of the uterus for retained products. The cervix must be dilated to admit the passage of one finger into the cavity of the body of the uterus and then either the whole hand or half hand is placed in the vagina. Pressure with the external hand on the fundus through the abdominal wall brings this part of the uterus within reach. The index finger is swept round the wall of the uterus and detaches the retained products from the placental site. Unless the hand or half hand is placed in the vagina it is quite impossible for the finger to reach the fundus of the uterus and detachment may be incomplete. Ovum forceps are now passed into the uterus and the pieces of placenta, which are now lying free, are removed without any risk of injuring the wall of the uterus. A finger passed into the uterus ensures that all the ovum has been removed. It is important to remember that the placental site is rough and shaggy and projects forwards into the cavity. It may be mistaken for adherent placenta and much harm may be done by scraping away pieces of the placental site. An intra-uterine douche containing 1 dram of tinct. iod. to the pint at a temperature of 105° F. is now given. Higher temperatures should be avoided except in cases of severe hæmorrhage, for a hot douche injures the decidua and diminishes its resistance to infection. The douche nozzle must be two-way and the douche can should not be raised more than one foot above the level of the patient. From time to time I see cases with the signs of mild pelvic peritonitis following upon vigorous douching after evacuation of the uterus. Experience with hipodol injections in determining the patency of the Fallopian tubes has shown how easily fluid passes from the uterus into the peritoneal

cavity.

The two common complications of evacuation of the uterus are hæmorrhage and sepsis. splitting of the cervix from rapid dilatation and perforation of the uterus with a curette are gross errors of technique. Very commonly smart hæmorrhage follows evacuation of the uterus: it is controlled by the injection of pituitrin, by the use of a hot douche at a temperature of 115° F.: if these methods fail, the uterus should be plugged with sterile gauze. Sepsis is a fairly frequent sequel of evacuation of the uterus. A rigor often follows the removal of retained products, and mild pyrexia for a few days is common. Occasionally, fatal septicæmia follows the removal of retained products in spite of absence of temperature or evidence of infection prior to the operation.

(c) Persistent hæmorrhage following abortion. Cases of this type are frequently seen and they present one of the most difficult problems with which the practitioner has to deal. It must be emphasized that the first menstrual period after a miscarriage is almost invariably excessive and sometimes the bleeding is very severe. One frequently sees such cases and often the practitioner is inclined to advise curetting to remove retained products. If there has been an interval since the abortion during which no bleeding has occurred it is almost certain that no retained products remain. Persistent hæmorrhage since the abortion is the essential symptom of retained products. The excessive menstrual period is controlled by rest in bed and the administration of active preparations of ergot.

Apart from these cases there is another group in which persistent uterine bleeding follows abortion, although there is no clinical evidence of retained products. Similar cases are seen after normal delivery and are more frequent if the infant is not breast fed. The bleeding may be continued for several weeks,

usually the daily loss of blood is not excessive and the patients are able to continue their daily work. The cause of hæmorrhage of this kind is imperfectly understood, in the past, it has been ascribed to sub-involution or to a mild endometritis. My own view is that it is comparable to that of metropathia hæmorrhagica, for not infrequently a cystic ovary is palpable and the endometrium shows necrotic areas.

Clinically the cases must be distinguished from cases of retained products and of chorion-epithelioma. In the typical case of retained products the bleeding is severe, the uterus is soft and bulky and commonly the cervix is dilated. Chorion-epithelioma is a very rare sequel of abortion; it causes severe vaginal bleeding, and one of the earliest signs of its development may be the growth of purple nodules in the lower part of the vaginal wall. In practice, cases of persistent bleeding following abortion are most often regarded as due to retained products and the uterus is curetted. The difficulty is that the type of case I have indicated above does not usually respond to this treatment. Nevertheless there is much to be said for curetting these cases; it establishes the diagnosis and allows chorion-epithelioma to be excluded.

*Septic abortion*—Fatal cases of abortion almost always come under this heading. Septic abortion is seen very frequently and in most cases is the result of criminal abortion. Pathologically, septic abortion does not differ essentially from puerperal sepsis and cases can similarly be grouped into the divisions of endometritis, septicæmia, salpingitis, thrombo-phlebitis, pyæmia, peritonitis and parametritis. In septic abortion certain groups are seen more frequently than with puerperal sepsis. Fulminating cases of peritonitis are not uncommon and salpingitis cases are seen very frequently.

In practice there are certain common clinical examples which present difficulty in treatment. One of

the most frequent is the case of retained products with high temperature and offensive discharge. The diagnosis of infection and retained products is easily made, but it is by no means easy to decide whether the uterus should be evacuated at once. It is undoubtedly true that this measure is followed by excellent results in most cases, but it suffers from the drawback that the infection may be lighted up and in some cases a fatal septicæmia follows. In Germany and America the tendency at the present day is to treat septic cases of this type expectantly; in most cases the temperature falls within a few days and evacuation is carried out four days after the temperature has fallen to normal. In this way the mortality of cases of this type has been greatly reduced. My own experience is that this expectant method suffers from the disadvantage that salpingitis and tubo-ovarian abscess develop more frequently than after immediate evacuation. On the other hand, in frankly septic cases a lower mortality is obtained with the expectant method. Each case must be treated on its merits. If there is no evidence of criminal abortion by instruments or injections, immediate evacuation gives the best results; in cases of severe sepsis the expectant method is to be recommended.

Another example of septic abortion is the case complicated by peritonitis. Peritonitis may develop either before or after evacuation of the uterus: in both cases the prognosis is grave and few patients survive. Simple laparotomy with drainage gives poor results except in those cases in which injected fluid has passed through the Fallopian tubes into the peritoneal cavity. Peritonitis, resulting from an infected uterus, is almost invariably spreading in type: localization in the pelvis is rare. Hysterectomy is the only procedure which offers any hope of success, but the operation must be performed early; it is useless to remove the uterus from a woman with

generalized septicæmia or from one who is in the last stages of a generalized peritonitis. Much depends upon the early diagnosis of peritonitis; a delay of a few hours may alter the prognosis completely. The diagnosis is often extremely difficult even when great experience is at hand. There are two main difficulties; the first is that patients with septic abortions often have abdominal tenderness and rigidity during the abortion and these signs disappear after the ovum has come away. The second is with cases of tubo-ovarian infection when abdominal signs may be detected. These latter cases arise some days after the abortion and can usually be diagnosed by expert pelvic examination. With other types of infected abortion, treatment is along the same lines as that of puerperal sepsis.

In conclusion, I would emphasize the permanent damage which may result from complicated abortion. Salpingitis and pelvic adhesions with their attendant symptoms of backache, dysmenorrhœa, and sterility, can frequently be attributed to septic abortion. Abortion cases demand skilled and careful attention and should not be lightly dismissed by the practitioner.



# The Treatment of Drug Addiction: A Review

By E W ADAMS, O B E, M D

## PART II\*

### RAPID WITHDRAWAL METHODS

QUITE arbitrarily, we shall regard as rapid withdrawal a period of not more than 14 days from the commencement of the treatment to the final dose of the narcotic. We shall also classify the different procedures into convenient sub-groups and deal first with the newer methods or those presenting special points of interest. There is some controversy as to the originator of the rapid withdrawal plan. Mattison<sup>36</sup> claims the honour and states that he described it in 1876. A method of this kind was, however, used in some cases by Levenstein,<sup>4</sup> and Erlenmeyer claims to have remodelled it and made it his own. His withdrawal period was 8-14 days.<sup>37</sup>

(a) *Rapid withdrawal with injections of autogenous serum.*—Modinos<sup>29</sup> has recently described a method which has some interesting points. The procedure is very simple and consists in the injection under the patient's skin of serum resulting from the previous application of a blister. The serum is removed from the bleb with a moderately thick needle and immediately re-injected subcutaneously. As great claims have been made for this plan, a few lines of more detailed description of it, as modified by Sioe and Hong<sup>38</sup> (who have treated 90 cases by it), may be worth while.

They use the cantharides cerate plaster of the Dutch Pharmacopœia cut to a size of 8 sq cm and 1 mm thick and aim at obtaining from 2-8 c cm of serum. This blister is applied to the

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patient's chest or abdomen and, after about 16 hours, they draw off the blister fluid and inject it in the upper part of the arm or leg, though the actual site does not matter much. The procedure is repeated on the third or fourth day, and a third injection is given about four to six days after the second. The morphine (or heroin) is rapidly tapered off and can usually be withdrawn completely in seven days, in some cases as early as three days. Modinos holds that antibodies are formed, but in accordance with the best authorities, Sioe and Hong reject this theory, and hold that an acute hypersensibility is produced to the addiction drug, and that this creates in the addict a distaste for the drug.

A still later observer, Dr. Noordhock Hegt, has critically studied the method and tested it against control patients treated by other methods.<sup>39</sup> He obtained good results, in so far as actual withdrawal of the drug was concerned, but did not find the results superior to those obtained by ordinary procedures. He regards the "hypersensibility" spoken of by other observers as not specific, but due to psychological factors. He obtained the same sensitiveness to the addiction drug by merely injecting common salt solution.<sup>1</sup> The method is fascinating in its simplicity, and there appears to be no doubt but that good immediate results have been obtained by it, at any rate among Easterns, but a critical study of the papers mentioned seems to lead irresistibly to the conclusion that the large claims made for it by its originator cannot be substantiated. Nor is there any real evidence that relapse is less frequent than after treatment by more orthodox methods. Hegt found on careful observation of 14 patients who had been "cured" by the vesicant method that five had already relapsed after so short a period as two months. Sioe and Hong did, indeed, think that there was promise of a lessened relapse rate, but neither their own cases nor those originally treated by Modinos were observed for a sufficient time really to determine the point. The blister-serum method may, indeed, prove to be a useful alternative plan in some cases, but it is already evident that no miracles are to be expected from it and much more extended trials are necessary before its final

place can be determined.<sup>57</sup> It should be stated that, before applying it, the precaution is taken of testing the urine.

(b) *Rapid withdrawal aided by drugs of the opium series.*—No one knowingly commits the error of substituting heroin or cocaine for morphine, as was sometimes done in times past. That would, indeed, be “to exchange Satan for Beelzebub.” It is worth noting, however, that Wolff found, in Germany, that some proprietors of private institutions were obviously ignorant that certain proprietary drugs contain opiates, and that these preparations were being innocently used to mitigate the abstinence symptoms in the belief that they contain no narcotic alkaloids. He deprecates, in consequence, the use of drugs of which the name does not disclose the constitution.<sup>40</sup> But there is one drug of the opium series, namely, codeine, which has been found very useful by certain observers during the withdrawal period. The value of the drug in this respect seems first to have been recognized as far back as 1885 by an American physician, Lindberger. Mattison, who gives this information in a paper dated 1893, is himself enthusiastic as to its merits.<sup>36</sup> He gave the drug in doses of 1–3 grains every 2–4 hours, and then gradually stopped it. The use of codeine to alleviate the withdrawal symptoms has been recently revived by Lambert and others.<sup>23a</sup> Lambert believes that “codeine is the only drug that really modifies materially and successfully the withdrawal symptoms of morphine.” His procedure is, in outline, as follows :

A ten-day reduction period is allowed, the morphine, etc., being reduced by one-tenth each day. Codeine is begun on the second day, and the dose rises with the decrease of the morphine. The initial doses are  $\frac{1}{2}$  gram every four hours, rising the next day to 1 gram, the third day to 4 grains, and 5 grains on the fifth day, all these doses being four-hourly. It is given in the same syringe as the morphine solution and the soluble codeine phosphate is the form chosen. Before beginning the treatment the bowels should be thoroughly evacuated. By this plan of giving the drugs together the patient does not know when the morphine is stopped and he is getting codeine only. The codeine is then gradually

tapered off, and saline injections substituted, until the withdrawal symptoms are over. "The advantage of this codeine and morphine treatment," maintains Lambert, "is that the patients suffer so little, there is no occasion for deception, there is no question of a defence reaction for fear of suffering, they get off their treatment without the irritability and fear of suffering that the abrupt methods and old methods of treatment gave them and so they are very manageable." He states that the treatment can quite well be given in hospital.

(c) *Rapid withdrawal assisted by endocrine preparations*—One method is described at length by Farra.<sup>41</sup> The dose of morphine is rapidly diminished and increasing doses of certain endocrine preparations are given. These contain liver extract and suprarenal extract, with other glandular substances. Adrenaline has also been strongly recommended by some authorities for use in the mitigation of the abstinence symptoms. It seems first to have been suggested, or at least first systematically investigated by two Argentine physicians, Rojas and Belby. Hence it is sometimes called the "Argentine method."<sup>41</sup> The method is described by Tassart and is a rapid withdrawal one (ten to twelve days).<sup>42</sup> After the first four or five days, when the dose of morphine has been reduced to a centigramme, adrenaline injections are gradually substituted (a  $\frac{1}{4}$  to  $\frac{1}{2}$  c cm of the 1 in 1,000 solution) for those of the narcotic, and it is stated that the patients cannot detect the change. Good results have also been reported in eucodism. Ephetonin, an adrenaline-like preparation which can be given by the mouth, has been tried by Bernhardt<sup>43</sup> and Wuth,<sup>45</sup> but the caution is given, both as regards adrenaline and ephetonin, that in sympatheticotonic patients the use of these drugs is not desirable.

It is interesting to note that the adrenaline and insulin treatments of addiction may possibly be related. According to some recent work by Zunz and La Barre,<sup>46</sup> a hyperinsulinæmia follows the injection of adrenaline, and this substance is claimed to be a physiological excitant of the secretion of insulin. It is not quite

certain, however, whether the adrenaline produces its effect directly by actual stimulation of the pancreas itself or indirectly by some other path.

(d) *Rapid withdrawal under light anaesthesia.*—This has already been described under abrupt withdrawal.

(e) *Rapid withdrawal under drugs of the atropine series*—According to Lambert, Lott of Texas was the first to use hyoscine in the treatment of morphine addiction, and he pushed its administration to the point of delirium. We will not, however, describe the treatment further since it is now seldom or never employed in this way, though hyoscine is still given by certain experts in a less radical manner and in conjunction with other drugs.

The classical treatment of narcotic addiction by drugs of the atropine series is, however, that of Lambert and Towns, and, though few now employ it exactly as it was originally described, it is still the basis of some modern procedures and deserves a short summary. The preparation used was a mixture of belladonna, hyoscyamus and xanthoxylum in the proportion of two parts of a 15 per cent. tincture of belladonna and one part each of a fluid extract of hyoscyamus and xanthoxylum. At the commencement of the treatment, two drops of this mixture were given hourly, and the dose gradually increased to the limit of the patient's tolerance for belladonna. Simultaneously as rapid a withdrawal of the morphine was conducted as the condition of the patient justified. An essential part of this method was the employment of a very free catharsis by means of blue pill, or some other purgative pill, followed by salines.<sup>47</sup>

Laughton Scott<sup>15</sup> employs Lambert's mixture with the substitution of plain water for xanthoxylum. His plan is to accomplish withdrawal under a gradually developed tolerance to belladonna and hyoscine with a free and increasing use of luminal. The dose is steadily increased and the treatment (which is inter-

mitted at night) is spread over 8 to 14 days, according to severity. The bowels are kept open, but exhausting purgation is avoided. The object aimed at is to secure the slow and careful reduction of the morphine *pari passu* with a development of belladonna tolerance so gradual as not to disturb the mental equilibrium. Post-withdrawal insomnia is combated by large doses of luminal. The author lays stress on the point that his treatment is not a rigid or mechanical one, but is constantly modified and remodified so as to suit the individual needs of each patient. As success depends upon this elasticity of the treatment, it is unnecessary to supplement the above broad outline by further details which may be sought in the author's book. Scott lays much stress upon the avoidance of "withdrawal shock," which he regards as playing "a more important part in the ultimate issue than is generally supposed."

Scopolamine in conjunction with hypnotics is employed by Hahn,<sup>48</sup> and in certain "twilight sleep" methods used in Germany, the details of some of which are not disclosed.

#### THE GRADUAL WITHDRAWAL METHOD

This is the method recommended by the Departmental Committee, whose description of it will be found in paragraph 38 of their report.<sup>5</sup>

#### THE CONDITIONED REFLEX METHOD

Charles Rubenstein, of the Los Angeles Sanatorium, has recently made the extremely interesting suggestion to use Pavlov's conditioning method in the treatment of morphine addiction.<sup>49</sup> He describes two cases at length:—

In the first each hypodermic injection of morphine was accompanied by the ringing of a bell, but later on massage of the dorsal surface of the forearm for one minute after each injection was substituted. In the second case a tuning fork held close to the ear until the vibrations ceased was used as the conditioning stimulus. In each case, after the reflex had been established, sterile injections

(physiological saline or water) replaced the morphine hypodermics "In both cases it was found that the treatment was rapid and effective and did not produce the so-called withdrawal symptoms" Rubenstein's patients were cases of pulmonary tuberculosis, but the method has obvious possibilities of extension.

#### SUMMARY

Thus the number of ways in which an addict may be therapeutically separated from his drug is very large, and the difficulty of choice correspondingly great. One thing emerges with great clearness, and that is there is at present neither any true "specific" nor any routine method of disintoxication and, therefore, no "best" treatment in the general sense. Each case has strictly to be considered on its merits, and also in respect of circumstances. As McIver and Price said long ago: "To try to bend the patient to a machine treatment is a very unwise procedure."<sup>50</sup> We have already stated that the gradual reduction method is regarded in this country as being, on the whole, the most suitable procedure, but this does not exclude a consideration of one of the rapid methods, or even one of the abrupt methods in favourable cases. The decision must ultimately be left to the physician himself, who alone is in possession of all the relevant facts in respect of any individual patient. Most observers agree, however, that cocaine may safely be withdrawn at once since the abstinence symptoms, unlike those in respect of morphine and heroin, are slight.

It is remarkable that those who employ the older methods are very conservative in their estimates, while the originators of new treatments are in the front rank of optimists. Perhaps when the newer procedures have themselves become mellowed by time, the enthusiasm of their sponsors will have become mellowed also. Too often the results reported merely mean that denarcotization has been successfully carried out. It may be that the mode of disintoxication employed

has some indirect influence upon the relapse rate, yet though disintoxication and rehabilitation can only be artificially separated it is wise from the practical point of view to think of them as two entirely separate and distinct stages in the treatment of addiction

(2) *Rehabilitation* — Having liberated the addict from his drug, the next step is to liberate him from himself. The treatment necessary to effect this is not only more difficult to carry out than disintoxication, but is more difficult to describe. For it is little less than the description of the creation of a soul "under the ribs of death" Mignard is quite right when he says. "In one sense every cure of narcomania, serious enough to have lasting effects, means a complete renewal of the mental bent and is in reality a sort of conversion"<sup>51</sup> He also makes another very wise remark: *On ne détruit que ce l'on remplace* We might even say that the craving is rather ousted than destroyed. The craving is only permanently removed if we substitute in its place something stronger and more potent. The old maxim that nature abhors a vacuum, though out of date in physics, still holds good in psychics.

Though it is convenient to separate the description of after-treatment and rehabilitation from that of relapse, yet a knowledge of the causes of relapse furnishes many valuable hints for the formulation of a plan of re-education. Obviously, the first matter to claim our attention is our patient's body, for psyche and soma, soul and body, act and react the one upon the other. The wise physician will study the causes which have led to the patient's addiction and, if possible, remove them. The origin of the habit may, for example, have been insomnia or some distressing or painful bodily ailment, and if this is capable of cure or alleviation, appropriate steps should be taken to bring this about. If we read the biographies of De Quincey and Coleridge, it is difficult to resist a conviction that had the former been advised to take sufficient



walking exercise, and had the latter's neuralgia been efficiently treated, it is possible that neither would have become an opium eater. But De Quincey fell into the hands of a crude purveyor of purgatives, and Coleridge chose to treat his own ailment.

As soon as the disintoxication period is satisfactorily completed, the patient's health should be built up by all means available, and, apart from medical treatment proper, there are two measures of great value : physical training and work. Lambert advises that the patient be sent, where circumstances permit, to a good physical trainer.<sup>47</sup> And he must *work* as soon as he is able. We must endeavour, as Mignard says, to replace the craving by means of those activities which the addict has too often discarded when he took up his habit. The work must be adapted to the patient's abilities and, where he has the capacity, intellectual and artistic distractions must also be provided. We aim at a "sublimation of tendencies illuminated by intelligence." Healthy sports have also their place, and an important one, in the process of up-building. His sense of responsibility to his family and to society must be cultivated anew. But though he must work and re-create, physical or mental fatigue should be carefully avoided. David warns that physical fatigue or mental lassitude, especially when combined with *tedium vitæ*, constitute the greatest danger for the cured habitué who has resumed work.<sup>52</sup> If he is a solitary, he should endeavour to become what Americans term a "good mixer," for in the addict's case the old proverb is reversed, and he is never more alone than when alone. If he is gregarious, he must change his herd. But he must be careful with whom he mixes. If, as is not seldom the case, his habit has been contracted through bad company and bad surroundings, a complete cut must be made from his former environment. The object of after-treatment is, as Dixon insisted, to replace association memories by substituting more dominant

desires<sup>53</sup>

In addition to all this, many experts are convinced of the great value of special treatment by one of the modern methods of "cathartic analysis." Addicts must, it is emphasized, be dealt with psychotherapeutically and the personality developed in a frankly pedagogic fashion. "In this re-education of the personality lies the chief hope of preventing relapse"<sup>52</sup> Many of the speakers at the recent discussion held at the Royal Society of Medicine also insisted upon this aspect of the matter. Dr. William Brown, while suggesting the employment of hypnotism in suitable subjects to mitigate the pains of withdrawal, stated that prolonged analysis was always necessary in addition, and Dr. Glover pointed out that the importance of a drug to the patient was largely psychological. Any non-psychological treatment, he said, might be compared to regarding scarlet fever as the "scarlet habit" and powdering the rash until it disappeared! The underlying narcissistic elements and paranoid tendencies were very important. We will not describe these methods. To do so in outline would be useless; to do so in detail would require more than all the pages of this journal. In any case, if it be decided to enlist the aid of psychotherapeutic methods, the patient will have to be entrusted to the care of an expert in such matters. Short of this, however, the personality of the physician counts for much, and without being an adept at psychotherapy, he can try to infuse his own saner mentality into the damaged psyche of his patient.

All this, of course, is extremely difficult of accomplishment. It is easier to say what should be done than to give practical advice as to how it is to be done. Very often we get no help from the addict himself. Though most will agree with Kolb<sup>54</sup> that practically all addicts, except the criminal psychopaths, would like to be cured, yet most will also agree with him when

he states that the motives which prompt many of them to seek cure are fundamentally inadequate and, therefore, usually ineffective. Their main urges are only too frequently the difficulties and inconveniences attaching to supply, the disapproval of their fellows and the social disesteem in which they are held, the fear of the law, the importunities of relatives and friends, and so on. Kolb, too, is undoubtedly right when he says that many addicts tend to take the view that the community should accept their addiction as an accomplished fact and leave them alone. Some practitioners are so impressed with the difficulty of after-care and rehabilitation that they would recommend long periods of surveillance in an institution and, on discharge, a renewed and prolonged supervision by a special medico-social service organized in connection with the treatment centre and, if necessary, compulsory re-treatments. Something of the sort seems now to be in operation in Brazil,<sup>1</sup> and in the case of criminal addicts, as well as some others, an experiment is shortly to be conducted in America by the provision of two "Narcotic Farms," for one of which a site has been chosen at Lexington, Kentucky (to accommodate 1,000 inmates), and plans are under way for the development of necessary buildings thereon. Another site has been selected near Fort Worth, Texas.<sup>55</sup> These farms will be administered by the Division of Mental Hygiene, by which name the old Narcotics Division of the United States Public Health Service is now designated. These institutions will be devoted to the cure and rehabilitation of the addicts consigned to them. The good effect of a very prolonged supervision is well seen by a study of the figures given by Nellans and Massee<sup>10</sup> for the Atlanta Penitentiary. In addict prisoners incarcerated for less than a year, the relapse rate was 90 per cent., but in cases in which the stay was from three to five years, that rate was only 17 per cent. It is obvious, however, that such thoroughgoing

measures are not practicable, and perhaps not even desirable in countries in which the addiction problem is not serious. However, in countries in which that problem is serious, opinion is undoubtedly moving in the direction of more radical measures than have hitherto been generally contemplated.

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(Concluded)

# Spontaneous Subarachnoid Hæmorrhage

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**S**PONTANEOUS subarachnoid hæmorrhage is a condition to which an increasing amount of attention has been paid in recent years, and especially since routine lumbar puncture in doubtful cases has enabled us to distinguish this condition from other intra-cranial vascular accidents. As a pathological entity it has been known for a long time. Samuel Wilks<sup>1</sup> mentioned it in the summer session lectures of Guy's Hospital in 1857, and gave a very concise account of the condition: "The blood may run beneath the arachnoid when the brain is injured or when meningeal apoplexy is a spontaneous disease, or when an apoplexy reaches the surface, or an aneurysm bursts or a tumour bleeds there." Apart from a few isolated cases it has only recently been recognized clinically.

The classical picture is the sudden onset of symptoms of meningeal irritation with absence of localizing signs and the occurrence of retinal hæmorrhages and a blood-stained cerebrospinal fluid. From many published cases, however, it is evident that numerous other symptoms may occur. The current views as to etiology and the chief clinical variations will be briefly considered.

*Etiology* — Hæmorrhage into the subarachnoid space may be diffuse or localized, e.g. petechial, and may vary in extent. It may be a complicating part of the picture of cerebral tumour, tuberculous meningitis, sunstroke, pertussis, septicæmia (especially anthrax), epidemic encephalitis, and blood diseases, such as leucæmia, hæmophilia, and purpura. We are here

concerned, however, with gross subarachnoid hæmorrhage in a patient with either no other demonstrable lesion or one causing few symptoms. This type of subarachnoid hæmorrhage may be found in association with the following conditions:—(1) arteriosclerosis; (2) "berry" or congenital aneurysms; (3) subacute infective endocarditis; (4) coarctation of the aorta; (5) polyarteritis acuta nodosa. Most cases belong to the first two groups. When subarachnoid hæmorrhage occurs in these conditions it is of sudden onset. There is no injury or obvious precipitating factor, and the term "spontaneous" seems justifiable.

The origin of intracranial aneurysms is not definitely known. Eppinger considers that they are congenital because they have been found in infants and are sometimes associated with other vascular abnormalities, such as nævi. Fernsides<sup>2</sup> found them in 1 in 125 of 5,432 necropsies. No inflammatory changes have been demonstrated in the aneurysms, but Collier<sup>3</sup> thinks they may be due to an otherwise symptomless blood infection. In all reported cases of subarachnoid hæmorrhage due to aneurysm formation in which it has been performed the Wassermann reaction has been negative, but in 10 cases without aneurysm out of a total of 124 cases of subarachnoid hæmorrhage collected by Symonds<sup>4</sup> syphilis was present.

*Symptoms*—Symptoms may arise before rupture, if one of these "berry" aneurysms becomes adherent to a cranial nerve. If calcification occurs in the wall of an aneurysm it may be demonstrated by X-rays. Other evidence of arterial disease may be present, but in many cases of subarachnoid hæmorrhage there are no premonitory symptoms. It should be noted that the vessel affected by arteriosclerosis, aneurysm, etc., may be in any situation, so that various syndromes may be found when rupture occurs. "Berry" aneurysms are most often found in the region of the circle of Willis, possibly because of the complicated

development of the vessels in this region. Hæmorrhage into the cisterna basalis spreading into the general subarachnoid space is therefore prone to occur. It is with these cases of subarachnoid rupture with diffuse spreading hæmorrhage that we are here concerned. It should also be noted that the sudden onset of coma without localizing signs and the finding of a bloody cerebrospinal fluid and retinal hæmorrhages may occur in a large cerebral hæmorrhage which has ruptured into the ventricles (the cerebro-meningeal hæmorrhage of From), since complete suppression of tone and reflexes is present at first. Such a case is invariably fatal and could not on clinical grounds be distinguished from a diffuse rapidly fatal subarachnoid hæmorrhage. If a case presenting this picture recovers it is probable that the hæmorrhage was subarachnoid only.

When rupture occurs the features of meningitis of sudden onset appear. Headache is usually intense and occipital, and there is stiffness of the neck, vomiting and often diplopia. Pyrexia may be absent at first. If the hæmorrhage is extensive, coma, deepening into death, is usual. There is, as a rule, no paresis or other localizing sign, but transient and variable extensor plantar responses may be found. In other cases leakage from a vessel may occur many times before a large rupture leads to death. Many variable symptoms then occur, such as headache, aphasia, impairment of memory, and paralyses of cranial nerves. In some cases headache may be absent. Sometimes encephalitis lethargica is simulated very closely, more especially when there is also subdural hæmorrhage. Certain rarer phenomena have been described in subarachnoid hæmorrhage. Massive albuminuria and glycosuria may be found and suggest medullary irritation. Korsakov's syndrome sometimes occurs during recovery, but the mental symptoms usually disappear completely.

*Methods of diagnosis.*—Two procedures are essential in arriving at a diagnosis. (1) ophthalmoscopy; (2)

lumbar puncture Retinal and sub-hyaloid hæmorrhages may be found and give a clue to the diagnosis They may be due to direct passage of blood along the sheath of the optic nerve, but since they may occur when the hæmorrhage never reaches the optic nerve they must also be due to increased intracranial pressure which causes obstruction to the return of blood from the ophthalmic veins Lumbar puncture will reveal blood which can be distinguished from blood due to the puncture itself by the fact that it is uniformly distributed in all samples and does not clot, and also that the supernatant fluid is often yellow Between the repeated bleedings of slow subarachnoid hæmorrhage and after a large non-fatal bleeding the cerebro-spinal fluid may be very yellow and contain flakes of lymph There is, however, no marked dissociation of cells and protein which would suggest a loculation syndrome It is important to realize that lumbar puncture in these cases may reveal almost pure blood, since the diagnosis has occasionally been missed in comatose patients because the blood was ascribed to accidental puncture of veins and the fact that the spinal theca had been entered was not recognized

*Treatment* —When there is no underlying condition, such as endocarditis, requiring treatment we have to rely on symptomatic measures There has been considerable difference of opinion as to the value of draining off cerebro-spinal fluid It is now generally agreed that it is a useful measure and the objection that it may increase the bleeding is not valid, since the rise of intracranial pressure produced by the escape of blood from a vessel raises the pressure in the vessel itself and so tends to increase the bleeding. Lumbar puncture by lowering intracranial pressure also lowers the pressure in the cerebral arteries and tends to stop the bleeding If the symptoms are due to increased intracranial pressure lumbar puncture will relieve them, and in any given case the manometer



should be the guide. In cases not immediately fatal improvement often follows repeated lumbar puncture after the first few days. In addition to causing increased pressure, blood also acts as a foreign substance in the subarachnoid space Bagley<sup>5</sup> has shown that it may cause meningeal thickening which may block the channels through which cerebro-spinal fluid is returned to the blood stream, and on these grounds also repeated lumbar puncture is indicated

The following cases illustrate the condition :—

*Case 1*—Male, aged 43, complained of pain in the back of the head and neck and soon afterwards felt faint and vomited. He became semi-conscious and was admitted to hospital. Bilateral extensor plantar responses before admission but, subsequently, flexor. Pupils normal. Bilateral papilloedema with hæmorrhages. Urine. Trace of albumin. A few casts. No sugar. No obvious arteriosclerosis or cardiac enlargement. CSF uniformly and heavily blood-stained. Death occurred 15 hours after admission. Autopsy showed rupture of a branch of the right anterior cerebral artery. No aneurysm or hæmorrhage into cerebral substance.

*Case 2*—Male, aged 56, collapsed at a race meeting and was admitted in coma. No history of previous illness. No paralysis or evidence of a localized lesion of C.N.S. Optic discs normal. B.P. 110, 80. Urine normal. CSF uniformly blood-stained. Autopsy showed a diffuse subarachnoid hæmorrhage. No aneurysm present. Basal arteries very atheromatous. Site of rupture not found.

*Case 3*—Female, aged 42. Became ill in the street and had pain in the neck and a feeling of tightness in the head. She vomited a few times and gradually lost consciousness. After a few hours consciousness returned but she remained stuporose. Both pupils dilated and fixed. There was a hæmorrhage in the outer side of the right disc. C.N.S. negative, apart from some neck rigidity. CSF. uniformly blood-stained. Protein increased. Sugar 63 mgms and chlorides 737 mgms per 100 ccm. W.R. negative. Later she became apparently normal, but 18 days after the onset she suddenly became comatose and died. Lumbar puncture just before death produced almost pure blood. At autopsy, there was organizing blood clot over the right cerebral hemisphere and recent blood clot at the base of the brain. No hæmorrhage into brain substance. Site of origin not found.

*Case 4*—Male, aged 12, complained of headache and collapsed when playing cricket. He was comatose when admitted to hospital and all his limbs were flaccid with absent reflexes. He improved slightly and his previously fixed pupils reacted to light. Optic discs were normal. CSF diffusely blood-stained. W.R. negative. Next day he became worse and died. Autopsy revealed a diffuse subarachnoid hæmorrhage involving the base and vertex of the brain and extending down the cord, the site of origin not found.

*Case 5*—Female, aged 33, complained of severe occipital headache

and vomiting a month before she suddenly became comatose. No evidence of a localized lesion of the brain. Optic discs normal. Urine. Trace of albumin, no sugar. CSF contained much blood. At autopsy, there was extensive subarachnoid hæmorrhage at the base and over the right cerebral hemisphere. At the junction of the right anterior cerebral and anterior communicating arteries was a tiny ruptured aneurysm. No laceration of the cerebral substance.

*Case 6*—Male, aged 30. Had sudden severe occipital pain and fell unconscious. Two and a half hours later he recovered consciousness and complained of very severe headache. Apart from marked neck stiffness no physical signs could be detected, discs normal. CSF contained much blood. WR negative. Six days later, he became comatose and died. No autopsy.

*Case 7*—Male, aged 50. Suddenly collapsed at work and became semi-comatose. No localizing signs. CSF uniformly blood-stained. Optic discs normal. WR negative. He recovered rapidly and left hospital normal, apart from slight impairment of memory.

*Case 8*—Male, aged 38. For five days before admission he had severe frontal headache of sudden onset. He was dull and drowsy, showed rigidity of the neck and a hæmorrhage in the right retina. CSF contained much blood and the supernatant fluid was yellow. Left hospital one month later but was mentally dull.

*Case 9*—Male, aged 10. Developed very severe occipital headache and vomiting while bathing. There was no injury. The only finding on examination was slight bilateral papilloedema without hæmorrhages. CSF uniformly blood-stained. WR negative. Five weeks later he was normal.

*Case 10*—Male, aged 44. Collapsed when getting up one morning and had severe left-sided headache which persisted for four days. On examination, slight bilateral papilloedema was present. CSF yellow and contained numerous red blood cells. WR negative. This patient subsequently became normal.

*Summary of cases*—10 cases are described; 8 were males (ages from 10 to 56), and 2 females (aged 33 and 42); there were 6 deaths (4 male and 2 female), the condition was confirmed at autopsy in 5 cases. An aneurysm was present in one patient and marked cerebral arteriosclerosis in another. In the remaining 3 fatal cases the investigations made did not reveal any obvious cause. In all cases lumbar puncture confirmed the clinical diagnosis.

### References

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# Sensitization to Wheat

By FRANK COKE, F.R.C.S

SOME typical examples of the clinical manifestations seen in those sensitive to foreign proteins are hay-fever from pollen, asthma from horses, and urticaria from shell-fish. All proteins, other than those forming part of the human body, are "foreign" to man, so that the range of proteins to which a patient may be sensitive is enormous, and the resulting disease takes many forms—asthma, eczema, rhinitis, urticaria, colitis, pruritis, migraine, and less often epilepsy and arthritis. These phenomena due to sensitization to proteins are known collectively as "anaphylactic," "allergic," or "atopic."

During the last ten years or so, it has been the custom of many to make use of the dermal reactions to test the patient's susceptibility to proteins; any protein that may be suspect is applied to a small scratch on the arm. About twenty minutes later a wheal like a nettle-sting will be found at that spot, recording a positive reaction if the patient is sensitive to the protein applied. Some proteins seem to cause larger wheals and greater clinical upsets than others, but there is no suggestion of any one protein being more toxic than any other, it is simply that some have greater powers of producing these allergic shocks than others. Nor can proteins be ranged in degrees of "foreignness" to man. Horse hair, pollen, Brazil nut and eggs are amongst those producing the largest wheals and the maximum discomfort.

However that may be, one would certainly expect to find wheat the least harmful of all, a food which is taken at least three times a day during a lifetime. I have always held that to become sensitive to a protein it is necessary to have an excessive dose of that protein, and then an incubation period—an interval of not less than two weeks free from the protein. If this were so,

one would hardly expect to find anyone sensitive to such a food as wheat, taken every day of the year; nevertheless, there is much evidence to support my argument. This article is based on the results obtained in testing 2,000 consecutive cases of asthma to the wheat protein. Fifty-nine patients, twenty-six were females and thirty-three males, gave positive reactions to wheat (3 per cent.)

The age of the onset is interesting, and suggests how these cases have become sensitive to wheat. Sixty-one per cent. showed symptoms before the age of two years, and 80 per cent. were under ten years of age. In early life, and especially in infancy, it has been found that protein ingested may pass right through the system, appearing in the urine, as shown by Schloss with regard to egg albumen in infants. Until quite recently we were taught that whole proteins did not pass into the system, it being supposed that hydrolysis occurred, reducing the whole proteins to much smaller molecules—the peptones and amino-acids. What is known as the Prausnitz—Kustner reaction throws much light on this. Blood from a patient sensitive to fish is injected subcutaneously into the arm of a normal person. If, now, the normal person takes fish by the mouth within the next day or so, a large erythematous swelling occurs at the site of the injection. The interesting point is, therefore, that fish eaten by the normal man passes through into his system as a protein, or at any rate in a large enough molecule to maintain its specificity as fish.

Going back to those infants who become sensitive to wheat, infancy is just such a time as they may be given wheat when they should be having mother's milk, and when longish intervals may occur, the food being suddenly changed again to a non-wheat diet, before the child is old enough to have arrived at the three-times-a-day regime of wheat, as taken by grown-ups. A very great number of these children—74 per cent.—

have suffered from eczema before the asthma developed—a dry form of eczema, chiefly in the flexures and around the wrists and fingers; in many this persists until they are grown up; in others the skin is dry and ichthyotic. Most of those who develop asthma in later life and who are sensitive to wheat are bakers, cooks or millers, the flour being inhaled into the lungs. Probably they, too, have intervals, such as holidays, affording incubation periods, wherein they develop the sensitization. Thus a baker left South Africa, where he was normal, but shortly after arriving in England—the incubation period having occurred on the boat—he was sensitized to wheat, and asthma developed.

Most of these cases are sensitive to other proteins as well as wheat. Sometimes there is a general sensitization to all the cereals, oats, barley, wheat and even rye; but quite often the patient shows no reaction to the other cereals, illustrating the extreme specificity of these reactions. I use the prepared and dried proteins in powder, and I think other forms of wheat are apt to give unreliable results. Flour becomes so easily contaminated by moulds that reactions may be obtained which have nothing to do with wheat, but rather to moulds and house dust.

There are, then, two main types of sensitization to wheat, one commencing in the earliest infancy, the other later in life, from some occupational or accidental surfeit of wheat. There seems to be a further distinguishing feature between the two, namely, that the children's form is due to intaking of wheat by the mouth, and most usually as bread, while the other affects the air passages, and is usually caused by flour, no ill result apparently following the taking of bread. Perhaps the most extraordinary fact about these types is the complete lack of suspicion that wheat is the cause of the patient's troubles. Without the help of routine skin testing it would have been quite difficult

to elucidate many of the following problems:—

*Case 1*—Miss X, aged 39 years, perfectly fit until two years ago. Has since had very occasional, but very severe, swelling of face, lips and back of the throat, violent sneezing bouts, and congestion of the conjunctivæ. At the same time some asthma develops, and altogether she feels as though she may be choked. The attacks occur mostly after lunch, and she thinks they may be due to beef. They usually occur at the same time as the menses. No family or other history that helps. Tested with 43 proteins she gave large reactions to wheat, flour and barley, none to oats. Going back to the gross attack which she had last week, she had for lunch an apple mixture that was thickly covered with white sugar and flour. Past attacks had probably been of the same nature. Further cross-questioning elicited this strange history. Shortly before being troubled with this complaint she was at some gathering of young people when the following rather foolish game was played. There was a bowl of flour, over which it was the game to get the victim to place her head, on some such promise that if she stared long enough into the flour she would see the man she was going to marry. Meanwhile, at the appropriate moment, her head was ducked into the flour. Beyond spluttering, she does not remember being upset by the flour, but that, no doubt, proved to be the sensitizing dose. She writes to me now that she is perfectly well, but finds that she has to avoid all contact with flour in order to keep so.

*Case 2*—A man, aged 33, working in an experimental gas station on Salisbury Plain, was sent to me because of eczema, thought to be due possibly to arsenic. Hay fever for 17 years, and a long history of eczema, which goes away when thoroughly sunburnt. Lost it for a year in Rangoon. Dermal reactions showed extreme sensitiveness to wheat, less to other cereals. Avoidance of these, and a course of mixed coliform vaccine so far improved him that he returned to work, and was very well.

Wheat is, of course, nothing more than a cultivated grass, but I have not found sensitization to pollen to be commonly associated with sensitization to wheat, any more than is sensitization to feathers, eggs and chicken flesh, so specific is the reaction.

*Case 3*—Mrs R, aged 47, took porridge for breakfast every day of her life until 16, then had an attack of "gastric flu", on resuming porridge some time later she found that it gave her nettlerash on the face and inside the mouth, and an attack of asthma developed within the hour. So she avoided it, but found that every time she took oatmeal by mistake she was ill in this way. She noticed also that the ingestion of oats brought on the period very soon afterwards. She gave large reactions to oats, barley and wheat. This case showed a very clearly spaced incubation period.

*Case 4*—Mr N, aged 38, a baker, started asthma at the age of 21. Had a cold, bronchitis, and then asthma. Now he goes six months free, but asthma develops as soon as he gets a cold, if he remains at work. Sneezes much at times, especially when using self-raising

flour Gives very large reactions to wheat and oats. Advised to get a mixing machine, as only the dry flour affects him, and was well after doing so.

Many patients only have attacks of asthma when they catch colds. At that time the nose and throat become raw with the cold and allow the protein to pass through, which normal mucous membrane is able to keep out, so that the flour affects them. Children who have asthma with a cold are often found to be sensitive to feathers. The substitution of kapok pillows will then allow them to catch colds without being followed by the usual sequence of asthma. But if this fact is not recognized, a cold means asthma, and the turgescence caused by the asthma invites the cold to travel down the bronchial tubes, laying further tracts open to the reception of the protein, and a vicious circle starts. Added to this, the patient is kept in bed with an increased number of pillows, and thereupon commences an imprisonment from which it may take him months to escape.

The treatment of these people who are sensitive to wheat is mainly by the method of avoidance. The better educated the patient, the more easily is this accomplished. Rice, potatoes, and the other cereals, if the patient is not found to be sensitive to them, can be taken in sufficient quantities to supply the carbohydrate requirements. Rusks can be taken, and a method of making these at home is to cut up into slices what is known as "milk bread" and to bake it brown in the oven. Whereas ordinary bread would become so hard that it could not be eaten, this milk bread becomes a rusk, and is easily masticated. Special mixing machines are of great assistance to bakers; others are able to avoid flour, once they know that they are sensitive to it.

I have not used the methods of specific de-sensitization for wheat, but non-specific methods, such as peptone and the mixed coliform vaccine, often make a considerable reduction in the degree of sensitivity, and allow of a little greater freedom in the patient's dealings with wheat.

# Case Report

## A Case of Undulant Fever

By GEOFFREY B. THRIFT, M.D.

THE following isolated case of undulant fever, which occurred in a crowded district in Derby, may be of interest. The patient, a girl, and her mother were accustomed to drinking a tumbler of milk every morning. It became known later that the farmer who supplied the milk had had five cases of abortion amongst the cattle on his farm.

The girl, aged 17, one of a family of nine, was first seen by me on the evening of May 21st, 1932. She had been "out-of-sorts" for two or three weeks previously, during this time she had complained of headaches and had been very irritable, an unusual thing for her. On May 20th she had a rigor and vomited once or twice. The vomiting was repeated on the following two days. The headache became much worse and she complained of being very tired. She was very constipated. When I saw her she had a temperature of  $102^{\circ}$  F and a pulse-rate of 90. Her tongue was very coated and covered with a yellow fur. She complained of severe frontal and occipital headache, and pains in both ankles and knees. I could find nothing in the chest, abdomen, nervous system, or joints to account for her condition. The following morning her temperature was still  $102^{\circ}$  F, the headache was confined to the occipital region and there appeared to be some neck rigidity with pain on flexing the head. She had vomited once more and the bowels were still constipated. In view of this combination of signs I thought it best to do a lumbar puncture. The spinal fluid appeared quite normal, a fact which was confirmed by bacteriological examination. The next day she was tender on palpation in the epigastric, splenic and right iliac regions. She had also developed an acute deafness in both ears, she had no pains in the ears and the tympanic membranes appeared quite normal. The bowels had moved and the motions were offensive, loose and of a pale brown colour. She was seen by my partner, Dr. Kinsey, on the same day, and we thought it was probably a case of typhoid fever. The headache, neck rigidity, vomiting, pains in the joints and deafness were only transient and did not recur. The urine was not examined during the first week as the patient was menstruating, but later it was found to contain a small amount of albumin, this albuminuria cleared up in a few days. The temperature continued to fluctuate, as is shown in the accompanying chart. The pulse-rate was never more than 96. The bowels became quite normal in about a





week's time. There were no further signs beyond the tenderness in the abdomen in the regions already mentioned.

On the eighth day (May 30th) I sent the patient's blood for a Widal test for the typhoid group, the blood was reported as giving a negative reaction with *B. typhosus*, *B. para-typhosus* A and B, and *B. gartneri*, but a positive reaction with *Br. abortus* and *B. melitensis*. On June 5th the blood-picture showed a slight increase in the relative size and shape of the red cells, with a distinct lymphocytosis—polymorphonuclears 11 per cent, large lymphocytes 31 per cent, small lymphocytes 25 per cent. On June 7th she was feeling much better and was anxious to have something to eat. She was still running on evening temperature and admitted having heavy sweats every night. At this stage I decided to give her an intramuscular injection of 0.01 gram of S U P 36, as suggested by Dr Forbes (*B. M. J.*, June 4th, 1932). Her temperature was 99° F. on the morning of the injection and rose to 102° F. the same evening. The following morning her temperature was normal, but I repeated the injection. Her temperature came down by lysis and stayed down for six days, only to rise on the evening of June 17th to 99° F. At this time the tenderness over the liver and spleen was more marked, the liver and spleen being definitely enlarged. On June 18th and 19th I gave her two further injections of 0.01 gram of S U P 36. Her temperature on the evening of June 20th was 100° F. This was the last occasion on which the temperature was above normal.

She continued to make good progress, although she still complained of heavy sweats at night. She was able to get up by June 24th and was out by the end of the month. She continued to have slight tenderness over the spleen and liver and in the right iliac region, but this passed off in a short time and she appears to be quite well again now.

#### BACTERIOLOGICAL EXAMINATIONS

The specimen of blood sent on May 30th gave a positive Widal reaction to *Br. abortus* with a dilution of 1/250 and to *B. melitensis* with a dilution of 1/125. Specimens of urine and faeces sent at the same time showed no organisms of the typhoid, paratyphoid or dysentery groups. The specimen of blood sent on June 10th gave a positive Widal reaction to *Br. abortus* with a dilution of 1/250 and to *B. melitensis* with a dilution of 1/50. *Br. abortus* could not be isolated from the milk obtained on the farm. A guinea-pig was injected with the milk with negative results.

I am indebted to Dr W. M. Ash and Dr Ross for permission to publish the details of the above examinations.

# Practical Notes

## *Headaches*

Julius Friedenwald and T H Morrison publish an interesting article on headaches, especially associated with digestive disorders. Headaches may be caused by many conditions and should always be regarded in the light of a symptom and not as a disease. In order to establish the direct cause a most thorough clinical study is required. It is quite evident that before pronouncing a headache of digestive origin causes outside of the digestive tract must be excluded. Headaches of digestive origin may be divided into two classes: those produced by organic and those by functional disease. Among those of organic origin are the ones associated with intestinal stasis, duodenal stasis and chronic cholecystitis. Whether the headaches due to intestinal stasis are reflex or toxic has not as yet been satisfactorily determined. In duodenal stasis headaches play a more or less persistent rôle. They may become incessant and migraine attacks are not infrequent as the result of toxæmia, which may be of so high a degree as to finally eventuate into an alkalosis. Headaches may occur in disturbances of the gall-bladder associated with jaundice and are the result of a toxæmia. Of the functional disturbances of the digestive tract associated with headaches the most common are those found in hyperchlorhydria and hypochlorhydria and gastro-intestinal neurasthenia. These are reflex in origin and are relieved by the administration of alkalis or acids, respectively. Headaches are exceedingly common in many forms of gastro-intestinal neuroses especially those associated with exhaustive states. They are frequently induced by over-exhaustion, both physical and mental, or by an exacerbation of the digestive symptoms. Rest ordinarily affords relief of this type of headache. Migraine may be at times of digestive origin. Occasionally a slight enlargement of the liver with tenderness in this region occurs during an attack and in some cases a fullness or pain has been noted in the region of the liver in addition to a distinct yellow cast of the skin. Stasis in the upper intestinal tract frequently plays an important rôle in the production of some attacks. From recent studies the impression is gaining ground that attacks of migraine may be regarded in some instances in the light of an allergic reaction due to a sensitization to certain proteins in our usual food and in others to excessive use of and faulty carbohydrate metabolism. In the treatment of headaches associated with the gastro-intestinal tract, relief can only be obtained when it is directed to the underlying cause. This necessarily involves the cure of the digestive disturbance itself —(*Medical Journal and Record*, New York, July 20, 1932, cxxxvi, 45)

## *The Treatment of Hæmorrhage in Peptic Ulcers*

Max Einhorn states that in his experience the duodenal tube has proved of the greatest possible value not only in the treatment of chronic simple peptic ulcers but also of peptic ulcers com-

plimented by acute hæmorrhage. He frequently employs the duodenal tube a short time (six to twelve hours) after a hæmorrhage and has never had cause to regret this, in certain urgent cases he has even introduced the duodenal tube immediately after the hæmorrhage. His treatment of a case includes absolute rest in bed, an ice bag over the stomach, adrenaline (eight minims of the 1-1000 solution in a teaspoonful of water) by the mouth thrice daily, and the injection of hæmoplastin. Since Linhorn has employed the duodenal tube he has never required to have recourse to transfusion, for feeding by the duodenal tube allows the patient to make his own blood — (*Le progrès médical*, July 30, 1932, lx, 1315)

### *The Cause of Death in Stillbirth*

J B Gillespie, Fellow in Pediatrics, the Mayo Foundation, has analysed the causes of death in 338 cases of stillbirth, as determined by post-mortem examination. The subjects came from an extensive metropolitan area, and were referred for post-mortem examination by general practitioners and specialists. Gillespie found that trauma at birth held a paramount place among the causes of foetal death, and prematurity, from whatever cause, was a potent factor. The deaths due to trauma at birth constituted 29.88 per cent of all the stillbirths, and the frequency of trauma increased with age, the greatest incidence being at ten months or more. In cases in which the foetus had matured or was past maturity, the size of the foetus was a factor necessitating operative procedure in which trauma was not infrequent. The most common injury at birth was laceration of the false cerebri, the tentorium cerebelli, or both, with or without intracranial hæmorrhage. In four cases there was hæmorrhage in the suprarenal glands and in one case the sole evidence of trauma was bilateral lacerations of these glands. Rupture of the liver and hæmorrhage from it occurred in three cases, besides intracranial injury. In six cases one or more bones of the skull were fractured — (*American Journal of Diseases of Children*, July, 1932, xlv, 9)

### *The Treatment of Hodgkin's Disease*

E L Jenkinson is of opinion that in the treatment of Hodgkin's disease, localized well-directed irradiation is superior to generalized treatment. For a number of years he was accustomed to treat by X-rays the entire lymphatic system of all patients suffering from Hodgkin's disease, as a prophylactic precaution. Some three years ago, however, he discontinued the practice of generalized irradiation in Hodgkin's disease and began treating only the enlarged glands, also placing the patient on a liberal diet, accompanied by plenty of rest and sunshine, in the belief that improving the patient's resistance acted as a definite barrier to the progress of the disease. When a patient presents himself for treatment and enlarged cervical and axillary glands are found, Jenkinson irradiates these areas, using a dose up to the point of a mild erythema, attempting to destroy the glands with one treatment. No more treatment is

given unless other glands become enlarged —(*Radiology*, New York, July, 1932, xix, 41 )

### *The Treatment of the "Indigestion Complex" with Emetine*

A Melvin Ramsay writes that he found flatulent dyspepsia to be very frequently due to simple enlargement of the liver, and that it could be successfully treated with emetine. Among the 38 cases on which his conclusions are based, the liver enlargement is ascribed in many to no definite cause, in a few to malaria, and in others to amoebic dysentery. In some the enlargement was slight, if at all demonstrable, but all cases had three complaints and three symptoms in common. The complaints were (1) The patients had all suffered from indigestion for years, (2) they had consulted many practitioners, (3) they had made the fortunes of many chemists. The three characteristic symptoms were (1) flatulence, (2) loss of appetite, practically always combined with a bad taste in the mouth, (3) a constant feeling of tiredness. In the average case routine treatment consisted in subcutaneous injections of gr  $\frac{1}{2}$  emetine twice a week for three weeks. (Emetine must be injected into the loose subcutaneous tissues, given intradermally or intramuscularly it will cause a necrosis. Further there is a danger of peripheral neuritis occurring after overdosage.) The result in all cases is described by the author as remarkable, and as a result of his experience he concludes that (1) emetine is the only drug which acts directly on the liver cell, and (2) the muddy complexion, furred tongue—indigestion complex—yields to emetine irrespective of liver enlargement. The latter seems to be merely a later development of the trouble. Details of ten of the cases are given —(*South African Medical Journal*, 28 May, 1932, 334 )

### *The Treatment of Lupus Vulgaris*

H Katerbow, Chief Physician of the Sanatorium at Oramenburg, has used with success an old-fashioned method in the treatment of lupus vulgaris. The method consists in burning the affected areas by sun's rays concentrated by means of a lens. Lenses of various sizes are used, according to the extent of the area to be treated, and the rays are maintained until a burn of the third degree is produced, with black scabs which come away in a few days. When granulations begin to form, these are again burnt, and one more burning is subsequently made. The area is allowed to skin over, and as a rule, he states, the lupus is then healed. He finds that burns from concentrated sun's rays give a more intensive burn than other applications. The treatment should be carried out with bright sunshine only. The area to be burnt is anaesthetized. If large it may be necessary to give a general anaesthetic, otherwise an analgesic ointment can be applied. The injection of novocain solutions is not recommended, as he found lupus developed at the site of puncture. Freezing with ethyl chloride may also be used. Pain is produced only during the act of burning and not later, and again when the scales fall off pain reappears, but the patients have declared that the pain is

altogether much less than they experienced under treatment by acids. When the burnt areas are healed, scars remain which at first are rather unsightly, but after a year or so are almost indistinguishable from the normal skin. The diet given to these patients is full and varied, salt is not omitted, but on the other hand spices are cut down and prominence is given to fresh fruit and vegetables — (*Münchener Medizinische Wochenschrift*, 15 July, 1932, lxxix, 1161)

### *The Isolation of Brucella Abortus from Tonsils*

C M Carpenter and Ruth A Bork point out that although undulant fever is now a well established disease of man, much information is wanting concerning its diagnosis, modes of infection, pathology and treatment. There are those who believe that *Brucella abortus* gains entrance to the body only through wounds, while others prefer to accept the digestive tract as the common channel through which the invasion occurs. In studying the effect of feeding milk artificially and naturally infected with *Brucella abortus* to calves, Carpenter observed that the lymph nodes draining the mouth and pharynx became infected first and remained infected the longest of any of the tissues examined. This observation on calves suggested a further study of diseased tonsils from man. A study was made on 55 pairs of tonsils removed by surgeons after such clinical diagnoses as abscess, hypertrophy, chronic tonsillitis, rheumatism, endocarditis and arthritis, a study was also made of the tonsils from a patient with undulant fever. The results of these examinations revealed *Brucella abortus* in either one or both tonsils from 8 of the 56 patients, in three patients, the organism was recovered from both tonsils, while in the other five it was obtained from only one. The authors do not desire at this time to convey the impression that *Brucella abortus* is a cause of tonsillitis or of hypertrophied tonsils. Nevertheless, in experimental and domesticated animals the infection localizes in lymph and lymphoid tissue, frequently producing a focal or general lymphaderitis. The most important deduction is that the presence of the organisms in the tonsils must be the result of ingestive dairy products containing *Brucella abortus*. The incidence of positive results depends on the virulence and the number of *Brucella abortus* in the raw milk supply — (*Journal of the American Medical Association*, July 23, 1932, xcix, 296)

### *The Relief of Pain in Cancer*

R J Behan emphasizes the value of calcium in relieving pain in cancer. At first calcium was given by him in the form of the chloride and administered intravenously, later the gluconate was given intravenously for cases in which a rapid reaction was desired, and intramuscularly (in 1 gram doses) if immediate results were not so urgent. In addition large doses of calcium (2 grams of the gluconate, thrice daily) were given by mouth, and also cod-liver oil, to stimulate the activity of the calcium — (*American Journal of Surgery*, August, 1932, xvi, 242)

# Reviews of Books

*Heart Disease the Principles of Diagnosis and Treatment* By  
CRICHTON BRAMWELL, M D, F R C P London Edward  
Arnold and Co, 1932 Pp vii and 244 Figs 52 Price  
12s 6d

WITH a good training in the laboratory investigation of cardiovascular physics the author follows in the steps of his father, the late Sir Byrom Bramwell, the great clinician, whose "Diseases of the Heart and Thoracic Aorta," published in 1884, represented up-to-date knowledge half a century ago. Since then much new material has accumulated and the methods of laboratory research have revolutionized cardiology. In the present volume the advances due to the late Sir James Mackenzie and Sir Thomas Lewis are admirably blended with the wise insight of the clinician who acts on the principle that the mental element modifies to a greater or less extent the clinical pictures of disease, this attitude is naturally prominent in the last section of the book, that on treatment and prognosis. While admitting that tobacco is a poison, though a pleasant one, to the heart, the author fully recognizes the individual differences of tolerance and would usually allow a chronic cardiac patient two ounces a week, or half the ration for an ordinary healthy man. The text is based on lectures forming part of a systematic course at Manchester, and is attractively clear, convincingly practical, and free from any solemnity. Clinical pictures and cases skilfully introduced largely take the place of all-inclusive descriptions. An early chapter on "imaginary heart disease" is followed by an account of the athlete's heart, thus recalling "University Oars" (1878), by John Morgan, a former Manchester physician. Dr Bramwell includes his own observations on two hundred Olympic athletes, and suggests that the explanation of the cardiac hypertrophy found in Marathon but not in other runners, is that the larger heart enables some men to become Marathon runners rather than that the condition of the heart is due to their exertions. The various forms of cardiac disorder are well illustrated by electrocardiograms. The success of this volume may be confidently prophesied.

*Vitamins A Survey of Present Knowledge* Medical Research  
Council, Special Report Series, No 167 London H M  
Stationery Office, 1932 Pp 332 Figs 34 Price 6s 6d

THIS valuable and timely report of a Committee appointed by the Medical Research Council jointly with the Lister Institute of Preventive Medicine follows similar summaries in 1919 and 1924. The chairman of this Committee is Professor Edward Mellanby, of Sheffield, the secretary, Miss Harriette Chick, and the general editor, Professor Arthur Harden. Since the first report in 1919 "On the present state of knowledge concerning accessory Food Factors (Vitamines)" many changes have taken place—the alteration in spelling is of course a minor event as compared with the enormous expansion of the subject, in 1924 three vitamins

ly recognized whereas now the existence of it is established. In the interesting historical introduction, just as was the case in the early days of the disease, there was a mental bias against the recognition of conditions due to such a negative factor as a positive influence, even if a merely antagonistic hypothetical toxin had a more attractive appeal. The prevalence of scurvy in the Royal Navy before James Lind's lemon juice was brought in at the end of the 18th century should have suggested a deficiency disease, but evidence based on experiment for the existence of it came from the school of Burge in Bonn, in 1881. It was slow, and Pelletier's definite statement of the doctrine, in 1905, failed to attract proper attention. The specific vitamin essential for reproduction (the subsequent chapters and the vitamin B complex of five or more constituents, is fully described, but in America known as vitamin G, has been called pellagra preventive dietary factor. A section is devoted to "pellagra," which is the term used to describe the condition in which rats can live and grow normally only on the vitamin B complex. It is infectious and spread by the faeces of infected rats, which contain more of these vitamins than those of rats deprived of these vitamins. It is also true that in infected rats the vitamin B complex is the means of a micro organism which, however, has not been isolated.

The amount of new knowledge set before the reader is of enormous importance and there can be no doubt, like the previous reports on vitamins, it will be of great value.

*all and the Blind the Vital Role of Medicine in  
of Civilization* By HOWARD W. HAGGARD, M.D.  
William Heinemann (Medical Books), 1932  
120 Illustrations 200 Price 21s

Dr. Haggard is Associate Professor of Applied Physiology, and has followed up his successful volume on "The Doctor and the Patient" (1929) by an equally, or perhaps more, valuable collection of essays, some grave, others with a touch of humour about the phases and fashions in medicine.

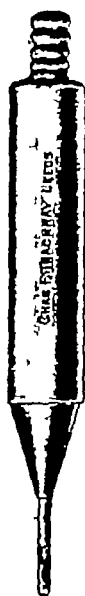
Pleasantly written with the avoidance of technicalities, it can be easily read by laymen and historians who can be converted to the author's conviction that almost the religion of man's salvation on earth, and the most humane philosophy that has ever been known, is illustrated in the proportion of one to every ten of many of a curious nature, and a number of these are reproduced, such as that of Sir John Hall, the first of the Metamorphosed Ajax, A Sanitary History of the first part of this volume, which is called "The History of Medicine", in the second part quacks are dealt with, and in subsequent parts part on "the humanitarians" deals with American medicine, and in subsequent parts



# Notes and Preparations

## INTRA-ABDOMINAL TUBAL INSUFFLATION CANNULA

Mr A C Palmer, F R C S, F C O G, writes —This instrument is designed for the insufflation of the Fallopian tubes from the abdominal cavity. When the result of the cervical insufflation is in doubt, and the abdomen has been opened for some other purpose, the use of the instrument gives definite information with regard to the patency of the tubes. In cases of displacement accompanied by adhesions, with or without closure of the abdominal ostia, the cannula again gives reliable information, it can also be used for stretching a fibrosed isthmus. Normally gas passes in one tube and out of the other at 30–50 mm Hg, and, on occluding one tube, the gas passes out of the cervix at a slightly higher pressure. For the purpose of stretching the isthmus, the pressure can be raised to 180–200 mm Hg without injury to the tube. This cannula was made for me by Mr Chas F Thackray, 252, Regent Street, London, W 1, and Park Street, Leeds.



## I-SO-GEL

I-so-gel is a new laxative, prepared by Messrs Allen & Hanburys (London, E 2) from bassorin, in the form of crisp, pink, almost tasteless granules. In a recent article in this journal, by Dr F B Parsons (*THE PRACTITIONER*, July, 1932, cxxix, 79), it was shown, as the result of experiments and clinical observations, that bassorin was more efficient as a laxative than agar, having greater hygroscopic qualities and requiring to be taken in smaller quantities in order to produce the same therapeutic effect. I-so-gel, being highly viscid when moist, does not leak through the anal sphincter, is not absorbed or digested, and does not cause griping or discomfort.

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We are asked to state that the makers of Decho in an article on "The Oral Treatment of I" (*THE PRACTITIONER*, May, 1932, cxxviii, 588) Riedel-E de Haen A G, of Berlin, and that the Old Strand Chemical & Drug Co, Ltd, Street, London, E C 3, and not as stated in

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**ANDERSON, A, M.D., Ch.B. Glasg., D.P.H.**, appointed Medical Officer of Health, Chorley

**ANDERSON, C. W. N., L.R.C.P. and S.I.**, appointed Certifying Factory Surgeon, Talysant, Cardigan

**BEVAN-JONES, J., M.R.C.P.**, appointed Senior Assistant Medical Officer, Grade II, Hackney Hospital

**BLIGH, J. M., M.D. Liverp., F.R.C.P. Lond.**, appointed Honorary Physician to the Royal Liverpool Children's Hospital

**BURKE, NOEL H. M., M.R.C.S., L.R.C.P., D.P.M., D.M.R. and E.**, appointed Medical Superintendent, Cell Barnes Colony for Mental Defectives, St Albans, Herts

**DALY, ASHLEY S., M.R.C.S., L.R.C.P.**, appointed Anaesthetist at Freemasons Hospital and Nursing Home

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**HILL, A. H. C., L.R.C.P. Lond., M.R.C.S.**, appointed Certifying Factory Surgeon, Rochester

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**LANKESTER, A. H. M.R.C.S.**, appointed Senior Assistant Medical Officer, Grade II, Queen Mary's Hospital for Children, Carshalton

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**ORR, J. W., M.D., D.P.H. Belf.**, appointed Lecturer in Experimental Pathology and Assistant Director of Cancer Research, University of Leeds

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**PECKHAM, R. B., M.R.C.S.**, appointed Assistant Medical Officer, Grade II, City of London Institution

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**SCOTT, T. S., M.B.**, appointed Assistant Medical Officer, Grade II, St. George in the East Hospital

**SIMPSON, W. N., M.B., Ch.B. Aberd.**, appointed Certifying Factory Surgeon, Stow, Midlothian

**SMITH, D. R. E., M.R.C.S.**, appointed Assistant Medical Officer, Grade I, St. Luke's Hospital, Lowestoft

**STRACHAN, G. I., M.D. Glas., F.R.C.P. Lond., F.R.C.S. Eng.**, appointed Professor of Obstetrics and Gynaecology, Welsh National School of Medicine

**SUTHERLAND, JEAN, M.B., B.S. Edin.**, appointed Assistant Medical Officer of Health, Hornsey

**TAYLOR, DOROTHY, M.B.**, appointed Assistant Medical Officer, Grade II, Fulham Hospital

**WATKINS, A. G., M.D., B.S. Lond.**, appointed Honorary Physician to Department of Children's Diseases (Medical), Cardiff Royal Infirmary

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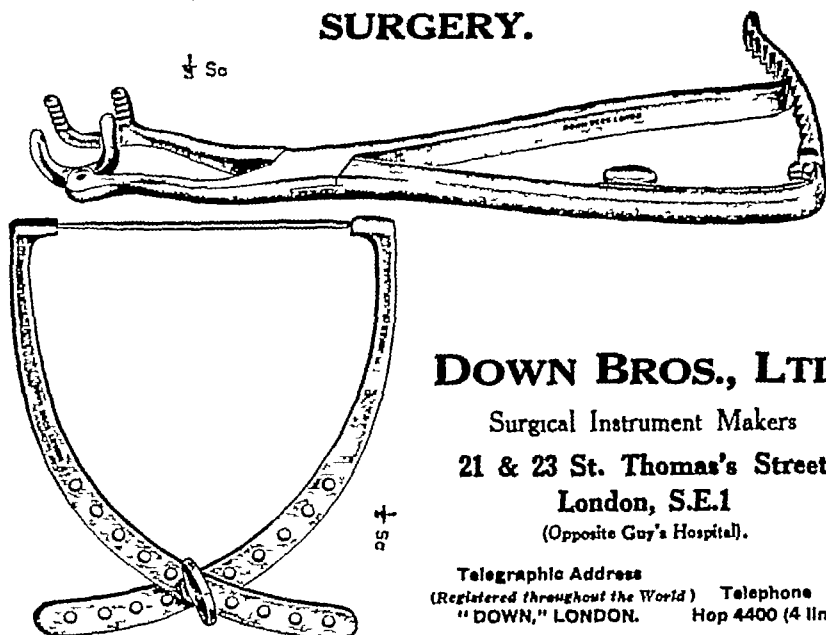
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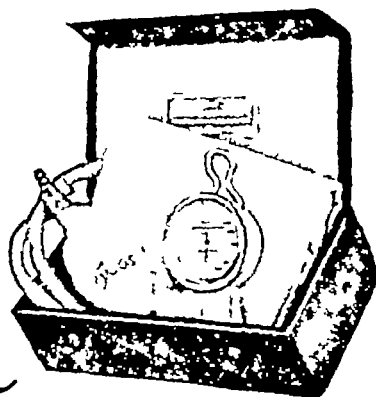


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Communications relating to the Editorial Department should be addressed to the EDITOR

Original articles, clinical lectures, medical society addresses, and interesting cases are invited, but are accepted only upon the distinct understanding that they are published exclusively in THE PRACTITIONER. Unaccepted MS. will always be returned.

Articles may be illustrated by black and white drawings or by photographs, if by the latter, negatives should be sent with the prints whenever possible.

Reprints of articles are charged at cost price and should be ordered when proofs are returned to the Editor.

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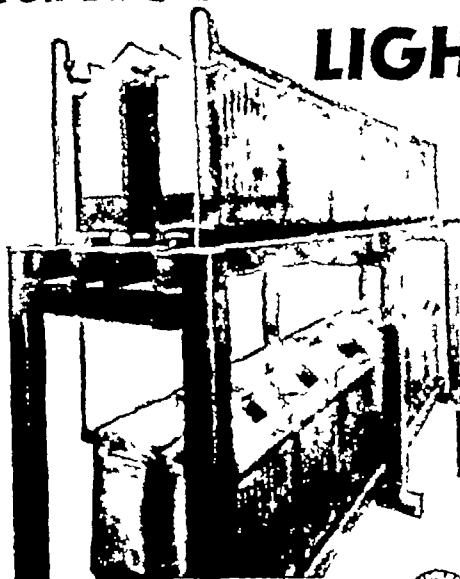
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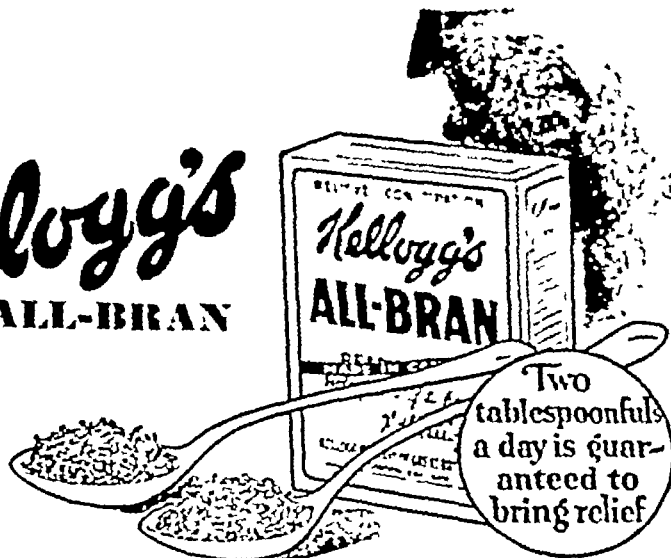
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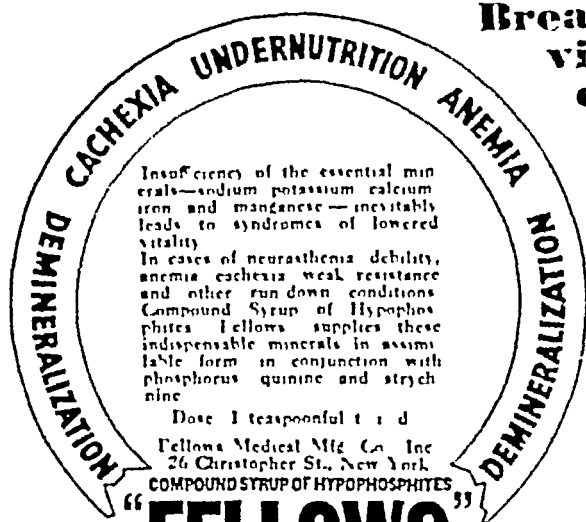
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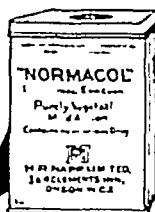
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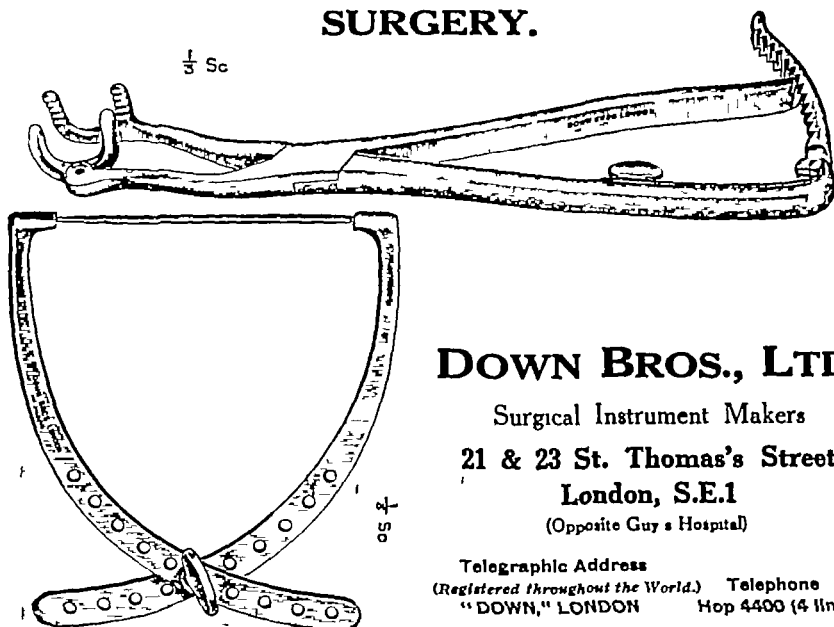
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The Treatment of Rheumatoid Arthritis with Gold  
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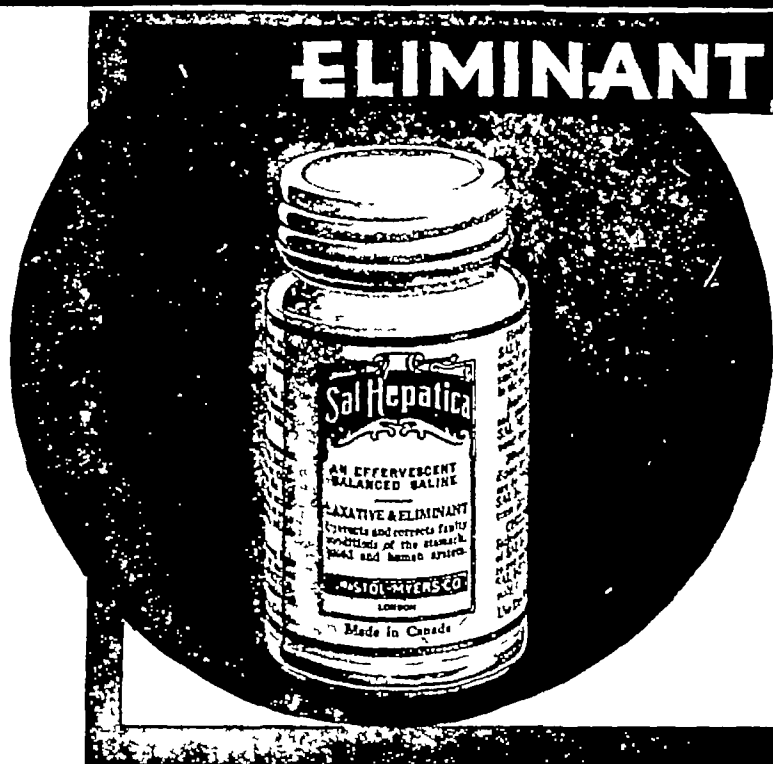
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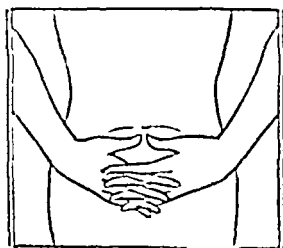
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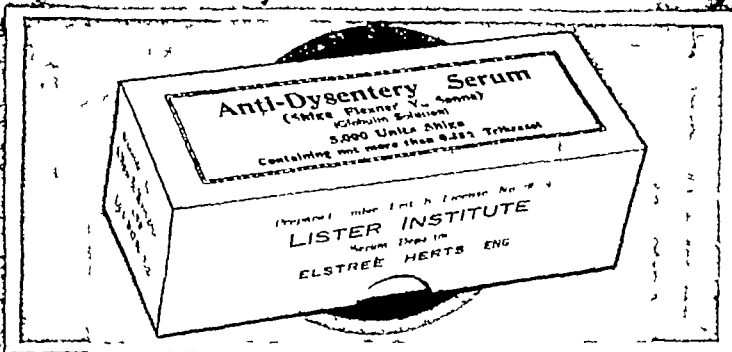
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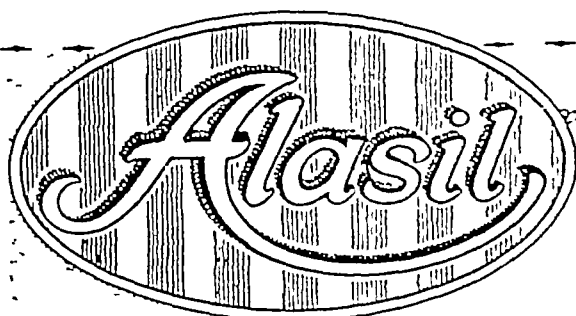


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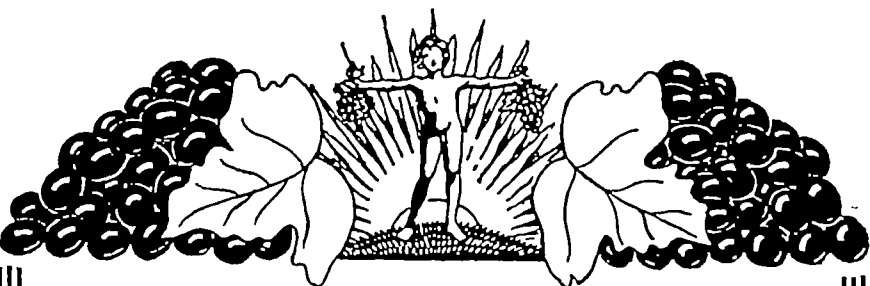
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It is authoritatively stated that "completeness of evacuation is even more important than regularity of evacuation." Many people who report a daily bowel movement yet manifest and experience the symptoms and discomfort characteristic of constipation. Laymen are not always good judges of adequacy in this matter.

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## A Plea for Periodical Examination to Reduce the Mortality from Cancer

By MALCOLM DONALDSON, M.B., F.R.C.S.

*Physician Accoucheur in charge of Out-patients, St Bartholomew's Hospital, Gynaecologist, Mount Vernon Hospital, Northwood, Consulting Gynaecologist, Royal Northern Hospital*

IF the Registrar-General's Reports for 1930 are carefully considered it will be seen that one in every six deaths over the age of forty is due to malignant disease, that is to say there are in England and Wales more than 55,350 deaths each year due to cancer. Moreover, it will be noticed that every year the number of deaths recorded is increasing, but whether this is a true increase in the incidence of the disease, or merely due to such factors as the increase in population, the increase in the age to which people live, and also the more accurate diagnoses that are made, is not easy to determine. What, then, is being done to lessen this appalling mortality, which is not confined to any one country? It is true that great efforts are being made towards finding out the etiology of the disease, and much work has been done in discovering the best treatment, but the efforts to find a method for detecting the disease in its early stages are very sporadic and totally inefficient. It is, however, on the early diagnosis of the



clinics are very much higher. In the Report on Cancer of the Rectum by the Ministry of Health, No 46, it is stated that 44.7 per cent. have a survival rate of three years or longer. These figures are again taken from a large number of clinics, and individual statistics show very much better results

It is equally certain that the earlier the disease is discovered the greater the chance of cure, and this is more true of malignant disease than perhaps of any other ailment. In all bacteriological invasions of the body and, indeed, in a great many other conditions, the body has a resistance which increases up to a point with the duration of the disease. In the case of malignant disease, however, if there is any resistance at all to the disease, the evidence goes to show that such resistance is diminishing from the very first. In the late stages of the disease, not only is it impossible for it to be eradicated because of the multiple foci throughout the body, but there is some evidence that the local growth itself is more resistant to treatment such as irradiation.

It will be seen, therefore, that in the present state of our knowledge the whole chance of success, whatever the treatment employed, depends entirely on early diagnosis, and although this is well known to every medical man, yet as mentioned above, nothing is being done on a large scale to bring about the possibility of the recognition of the disease in its early stages. In a Report issued by the Ministry of Health (No. 66) it is stated that only 50 per cent. of patients suffering from the disease seek medical advice in a sufficiently early stage of the disease to have any proper cancer treatment, such as irradiation or operation. In the Report on Cancer of the Uterus already referred to, it is stated that on an average a period of six to nine months is allowed to elapse between the first occurrence of symptoms and the patient's attendance at hospital, and in the case of cancer of the rectum on an average a period of twelve months is allowed to elapse between



the first slight symptoms of the disease and the patient's coming to operation.

Why does this state of affairs exist? It is sometimes suggested that it is due to the imperfect training of the medical practitioner. This is most certainly not the reason why patients come for treatment when the disease is so far advanced. It is a common experience of surgeons at a hospital, particularly of gynaecologists, to receive a letter from a practitioner saying "Mrs. X consulted me for the first time two or three days ago, when I found she was suffering from advanced malignant disease." Sometimes they mention that in spite of the fact that they have been attending the case for various minor ailments, yet the patient omitted to mention a symptom which would at once suggest to the medical man the necessity for further examination. It will be seen, therefore, that in the majority of cases the practitioner is in no way responsible for the late diagnosis of the disease.

The evidence, indeed, is overwhelming that the fault lies with the patient, and there are two reasons for this state of affairs. The first of these is psychological, namely, *fear*, and is very difficult to contend with. The existence of this widespread dread of cancer is sometimes denied by medical men, on the grounds that if it existed more people would talk about their fears, and in point of fact very few patients do. This is an entirely erroneous argument, as those who do speak of it openly are just the people who have to some extent overcome their dread of the disease, whereas the majority of patients go to their doctors and dare not mention the subject.

It is within the experience of every practitioner that patients come to them complaining of indefinite symptoms in the hope that a reassuring negative answer will be given concerning the existence of cancer. If the practitioner suspects the real trouble, namely, dread of the disease, a casual remark to the effect that

there is no cancer or tumour present brings such obvious relief to the patient that the real cause of the visit is at once evident

In a great many cases, however, the true reason for the visit is not suspected, and the patient is given a tonic and some general words of encouragement, which leaves him a victim to the same haunting fears. Unfortunately also it not infrequently happens that if he is brave enough to state frankly the reason of his visit, he is told "not to be so foolish" and advised to forget about it and not be fussy. Could any treatment be less likely to help the wretched patient?

It does not require much imagination to realize why this fear is so widespread. A short time ago inquiries were made as to where patients went to during the last months of their lives, and it was ascertained that the majority returned to their homes. In these homes they are waited upon and nursed by their own relatives. Is it to be wondered at that these latter worry lest they themselves are to fall the next victims to a disease which appears "from the blue" and ends with such horrible pain and misery? Every year adds another 55,000 families to the list of those who have undergone this experience and when any of them summon up courage to see a doctor and ask if there is any sign that they themselves have it, they are often met with the well-meant remark. "Don't be so foolish—why should you have it?"

The second reason for delay in seeking medical advice is the fact that in the majority of malignant conditions there is no pain or urgent symptom until the disease has reached an advanced stage. Having once realized that these are the two main factors which prevent any great improvement in the ultimate results of treatment, it is essential that a national effort should be made to overcome them.

There can be only two methods by which earlier diagnosis may be obtained, namely, to teach the public

the slight symptoms that may arise in the early stages, but in fact are very often absent, or to encourage the periodic inspection of the fit. Even if the first of these methods were possible, namely, to educate the masses concerning symptoms, would it be desirable? Is there not a real danger of people thinking too much about whether they have the symptoms, and if they have them, coming to a wrong conclusion, i.e. that they are suffering from the disease, and thus becoming confirmed neurasthenics? Imagine the result of such knowledge on the mind of one of these pseudo-medical students, who notices that he is suffering from the very distressing but almost universal complaint of hæmorrhoids. He remembers that a certain leaflet says hæmorrhoids are present in cancer of the rectum. Next day they have disappeared, a few days later he thinks he has some, but is not sure. Can any better method be devised for creating a nation of neurasthenics? To discuss symptoms individually with the more intelligent patients may and does do a great deal of good, but to broadcast symptomatology to all and sundry can only do a great deal of harm.

It remains, therefore, to encourage periodic visits for inspection of the fit. What are the pros and cons of such a proposal? The immediate result of such an endeavour would be to relieve the minds of thousands of people who fear the disease but will not approach a doctor for fear of being laughed at. If proper observations and records are made at such visits it will materially advance the knowledge of "precancerous" conditions and will bring to light the existence of a great number of early malignant growths.

What then are the possible objections to such a scheme? At first sight such a proposal as that advocated would seem so revolutionary as to be impossible of attainment. It is suggested that no individual would go to a doctor when he was feeling hale and hearty. This objection, which sounds so reasonable,

is not borne out in the case of periodic visits to the dentist, which are undertaken by quite a large number of the community. Again, thirty years ago the idea of ante-natal care and examination would have been considered quite impossible. Does anyone suggest at the present day that there is any expectant mother who would refuse such an obvious precautionary measure? Why, then, should not periodic overhauls to exclude cancer be equally possible?

Turning now to the so-called practical objections to the scheme, it may be said that the average person has not got sufficient means to afford such visits to the doctor. If there is really a large section of the community in such a poverty-stricken condition, then diagnostic centres, connected with the larger hospitals, would be no more expense to the nation than the nursing of moribund patients suffering from the disease.

Again, it has been suggested that only a minority of the general practitioners are competent to make a diagnosis of malignant disease in its early stage. In the scheme suggested, however, they are not asked to take on such a responsibility. General practitioners are only asked to say whether a certain organ—tongue, breast, cervix or rectum—is *normal*, and if found to be in any way abnormal, to send them on to a hospital for definite diagnosis. One of the most hopeful signs of the times is the increase in cases sent up on suspicion.

It will be seen from the above that the early diagnosis of cancer must depend largely on the medical practitioner. It must be admitted that it is not easy for a busy practitioner, who only sees on an average two or three cases a year, to become interested in a suggestion which at first sight sounds so revolutionary, but there can be no doubt that if he thinks about the matter and realizes that the success of this scheme means that the five-years' survival rate will go up by leaps and bounds, then the whole-hearted co-operation of the profession is assured

# The Surgical Aspect of Toxic Goitre

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THE thyroid gland and its pathological and physiological disturbances have of recent years been the subject of numerous investigations. It is well known that some enlargements of the gland are associated with general disturbances, which affect other systems in the body, such as the cardio-vascular, nervous and intestinal systems. Whether this is due to an increase in thyroid secretion or to some abnormal secretions poured out by a diseased gland, and whether the primary condition is in the thyroid, or that the thyroid state is secondary to some other process occurring elsewhere in the body, our knowledge at present does not permit us to state; but one fact is clear, that the limitation of the secretion of such a diseased gland either by medical treatment or surgical removal of the gland produces an amelioration of the symptoms and signs that amount in a large number of cases to a cure of the disease.

Toxic goitre is most commonly found in women, and can be definitely placed in two classes, the first in which there is a sudden enlargement of the gland, accompanied by other symptoms and signs such as tremor and tachycardia, and later exophthalmos. This type used to be spoken of as exophthalmic goitre, but is better classified as primary toxic goitre. It occurs chiefly in young women who are usually doing some type of mental work, commonly secretarial or teaching. The onset is sudden, and a careful inquiry into the history will usually elicit a story of some mental shock of a severe character. The examination of such a case reveals a moderate but very definite soft enlarge-

ment of the whole thyroid gland, with excess of arterial pulsation, especially at the upper poles. The patients' general condition is characteristic, they are restless, moving both eyes and body in rather jerky movements; if seen in bed the clothes are thrown down from the upper part of the body, with arms and neck exposed, and if clothed and sitting up are constantly throwing back their coat from the upper part of the neck and shoulders as though to get more air. The skin is damp and acting freely, the pulse is rapid and there is a tremor of the outstretched hands, with a finer tremor of the tongue.

In early cases the patient is usually well covered, but in cases of some standing marked wasting occurs. As the disease progresses the gland tends to get smaller and firmer and the general toxic symptoms more marked, and the case may end fatally from the breakdown of any of the systems involved, failure from a fibrillating heart, acute mania from a toxic nervous system, or asthenia from diarrhoea and vomiting. In the absence of a fatal termination the disease may burn itself out leaving behind a wreck, whose only existence must be that of an invalid.

A disease with such possibilities for disaster must clearly call for early diagnosis and treatment, and I propose only to deal with the surgical aspect, which experience shows holds out the best hope for the quickest return to a normal state. The surgical approach to such a case necessitates in the first place complete rest away from the home or business environment; it is not possible to say what length of time will be necessary before operation. A careful watch is kept on the pulse-chart, and on the general behaviour of the patient as regards nervousness and weight, and at this stage a mild sedative should be administered. Careful note of septic foci is made, and if any are present they should be removed. Septic tonsils are very common in this disease, and should be removed

immediate pre-operative preparation is a considerable strain on these toxic patients, and it is frequently found that a patient's pulse-rate, which has been quiet over a period of days, suddenly rises by thirty or forty, a fact that adds very considerably to the operative risk; the anxiety period can be greatly reduced by some pre-anæsthetic medication. Avertin or some other hypnotic is a satisfactory method of overcoming this difficulty, and even the unusual procedure of the passing of a rectal tube can be in part overcome, by giving small rectal salines for some days before the operation

After the administration of avertin the operation can be performed with the addition of a light ether anæsthesia or with novocain, if the case has a fibrillating heart local anæsthetic should always be used. In a certain number of cases even these precautions are unavailing and the pulse-rate rapidly rises to 180 or even 200, and when this occurs the patient should be returned to bed and the operation postponed

The details of the operative procedure need not be discussed here, with the exception of the amount of gland to be removed. This is a difficult problem, no fixed numerical amount can be stated, each case being dealt with at the time. Those cases that have reacted well with Lugol's iodine are apparently cases in which an involution process is rapidly produced in the gland, and it is possible that in these cases the removal of too much thyroid, together with a subsequent involution in the remaining glandular tissue, may produce a mild degree of myxœdema. This myxœdema, if occurring, can be controlled by thyroid extract, but it is doubtful if this is altogether satisfactory. Those cases therefore which have given evidence of marked involution changes under iodine treatment probably require less gland removed than the cases where iodine has produced little or no improvement. The gland itself, when cut across at operation, also gives some indication

as to the amount of involution that has taken place under iodine treatment; this is more easily noted in the primary toxic cases, the involuted gland having much more colloid and the beefy appearance of the untreated toxic gland being absent.

These considerations should help us at the time of operation, but nothing can be more disappointing than to find from the subsequent clinical picture that too little gland has been removed, and in the present state of our knowledge it is as well to err by removing too much. In those cases of secondary toxic goitre with a single adenoma, it must be remembered that the removal of the adenoma is not sufficient, the rest of the gland is almost certainly the seat of hyperplasia, and must be dealt with in a similar manner to the primary condition.

Immediately after operation these patients are inclined to be restless, and it is most important that this should be controlled. It is best done by frequent small quantities of morphia, which not only keep the patient quiet, but ease the tracheal irritation from which most of them suffer, and the day after operation a fresh course of Lugol's iodine is started. With the greatest care, before, during, and after operation a certain number of cases continue to have a mounting pulse-rate, and in some cases a mounting temperature. In such patients iodine medication must be pushed, if there is no vomiting it can be given by mouth, if there is vomiting it should be given by the rectum, subcutaneously or intravenously, depending on the condition of the patient. This is combined with glucose saline and more frequent morphia injections.

The subsequent convalescence in the ordinary course should be prolonged, six months' further rest after the operation should be insisted upon, and no patient should be allowed to return to their normal activities without being re-examined.



# The Medical Treatment of Graves' Disease and Toxic Goitre

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IT is mainly the custom to regard Graves' disease and hyperthyroidism as practically synonymous. If this conception is correct the problem is simple; there is too much thyroid, remove some. When it was demonstrated that the symptoms of Graves' disease could not be entirely reproduced by administering large doses of thyroid extract, the conception of dysthyroidism arose, this considered the condition to be due to too much of an abnormal secretion. This has something to be said for it, as will be noted below. But as there are only two substances which counteract the toxicity of acetonitrile, normal thyroid extract and the blood of cases of hyperthyroidism, we have to agree that hyperthyroidism is actually present. It is customary to regard Graves' disease and toxic goitre as two separate syndromes, chiefly from gross morphological and regional considerations. But as regards the metabolic standpoint, and, as I hope to show, the results of medical treatment, there are no differences. In this article Graves' disease and toxic goitre are classed together as severe hyperthyroidism.

My active interest in this problem arose after the influenza epidemic of 1918; I reported that typical cases of severe Graves' disease were not uncommon as a sequel,<sup>1</sup> and noted that milder grades were quite frequent. It may be observed that the recent epidemic of influenza is also causing hyperthyroidism, two such typical cases have been seen within the week of writing

this. At about the same year, McCarrison's observations and experiments in the Himalayan foothills were published—how by polluted water and by faecal cultures he could produce goitre at will.<sup>2</sup> Since, to my mind, goitre, toxic goitre and Graves' disease appeared to be closely related, it appeared to be of interest to try whether dietetic measures could favourably influence the course of the disease. If an enteric infection was the root cause, then an alteration of the condition of the intestines might alter the bacterial flora; so I began to treat these cases with a high carbohydrate diet in 1919. This diet rigidly excluded milk and all milk products except butter, eggs and all animal proteins; the patient was encouraged to eat largely of fruits, vegetables, starches and sugars. By this means it was hoped to get a shift in the enteric p<sup>H</sup> and an alteration of the flora. The result was good, the patients responded favourably, but the explanation is probably quite different from that postulated at first, such a diet is calculated to help in the disordered metabolism of hyperthyroidism in another way.

To return to pathogeny; excess of thyroid extract will not produce all the symptoms of hyperthyroidism; it will not produce the exophthalmos which gives a synonym, exophthalmic goitre. In order to obtain exophthalmos, an excess of adrenaline must be added to an excess of thyroid extract; by this means the condition of myxœdema has been converted to that of Graves' disease.<sup>3</sup>

Exophthalmos is treated on the Continent by yohimbine; yohimbine acts somewhat like nicotine, by paralysing those myo-neural junctions which are acted upon by adrenaline. Thus, to hyperthyroidism we have to add hyperadrenalism, an excess of the medullary adrenal hormone. Yet Cramer and others postulate the adrenal as restraining the thyroid; a good discussion is given by Langmead.<sup>4</sup> Cramer suggests that Graves' disease is due to a breakdown of the

adrenal cortex restraint on the thyroid. Thyroid feeding in animals is followed by hypertrophy of the adrenal cortex; there is an increase of the basal metabolic rate and the thymus hypertrophies after adrenalectomy—constant findings in hyperthyroidism; depressive X-radiation of the adrenals has been employed therapeutically in hyperthyroidism.<sup>11</sup> We must conclude that there is an excess of the medullary adrenal hormone, and postulate that this medullary stimulation is followed by, or is due to, a diminution of cortical activity which normally restrains thyroid function. Marine has shown that treatment of hyperthyroidism with the recently discovered adrenal cortex hormone is of benefit.<sup>5</sup>

Another possible factor, the metabolism of the muscles, should be considered. Zondek<sup>6</sup> has shown that normal muscle in alkaline Ringer solution takes on a metabolism similar to that of muscle in hyperthyroidism; in acid Ringer solution the metabolism of myxœdema was noted. In both cases the addition of small amounts of iodine counteracted these changes, and brought the metabolism to normal. Hyperthyroidism might also be regarded as due to some toxic factor altering muscular metabolism and requiring a greater output of iodine from the main iodine depot—the thyroid gland.

There are one or two other aspects of this abnormal thyroid activity and iodine metabolism which deserve notice. Abelin<sup>7</sup> has shown that the thyroid normally produces two iodine-containing substances—thyroxin and di-iodo-tyrosin; thyroxin alone increases the basal metabolic rate and depletes the liver of glycogen; di-iodo-tyrosin has no action alone, but when added to thyroxin it lessens, or prevents its action, depending upon the amount. He found that rats, fed on large doses of thyroid, showed signs of hyperthyroidism, di-iodo-tyrosin administration was followed by a depression of the basal metabolic rate; continuous administration

of a diet rich in carbohydrate and vitamins, poor in all proteins other than casein, gradually reduced the basal metabolic rate and the symptoms to the normal, although the administration of thyroid was continued. He states that di-iodo-tyrosin is beneficial in Graves' disease, but gives no case notes. Abeln appears to have given some proof that dysthyroidism is present in hyperthyroidism; that the condition is due to a lack of the normal restraint of di-iodo-tyrosin. Also it raises the possibility of hyperthyroidism being a disorder of tyrosin metabolism, for adrenaline, thyroxin and di-iodo-tyrosin are all abnormal in amount in Graves' disease, and all are tyrosin derivatives. The most important point in this work is the observation of the value of diet.

Then Schittenhelm<sup>8</sup> has shown that the blood iodine is high in hyperthyroidism and low in myxoedema; that injection of adrenaline causes the blood iodine to rise in both conditions. He found that the blood iodine was increased by adrenaline even after complete thyroidectomy, so that other iodine depots than the thyroid must be present. These were found to be in the mid-brain, especially the tuber cinereum—the part most intimately related to the activity of the endocrine glands. In animals fed on thyroxin the iodine content of this part rose considerably; in sub- or a-thyreosis the values were much less than normal. He considers that hyperthyroidism may be due to an abnormality of the mid-brain, whereby an increased amount of iodine is taken up, this leads to hyperactivity of the centres controlling endocrine function, and thus a vicious circle originates. He states that X-radiation of the tuber is useful in treatment. Closely related to this is an observation on excessive fluoride medication in man; this may lead to a transient diabetes insipidus<sup>9</sup>. Crew and Wiesner have recently demonstrated a thyroid-stimulating substance in the pituitary<sup>14</sup>. Thus, fluoride might act by depressing

these hyper-active mid-brain centres.

We do not yet know the exciting cause of hyperthyroidism, but we do know that infections, pre-existing goitre and emotion are important. We know that as a result of these unknown causes the thyroid and the adrenal medulla secrete more hormone than normally; that muscular metabolism is altered inasmuch as more oxygen is required and in spite of this, more lactic acid is produced; that the iodine of blood and tissues is increased. How these changes can produce some of the symptoms of hyperthyroidism must be considered, and especially the metabolic changes must be examined.

Both thyroxin and adrenaline stimulate the liver to break down glycogen, liberating glucose in the blood; in addition they appear to prevent ready re-synthesis of lactic acid to glycogen. Thus, hyperglycæmia follows and glycosuria is frequent. Some cases are only with difficulty distinguished from diabetes mellitus. Glucose is thus wasted, still more important is the action of the hyperglycæmia in depressing insulin production. Before the isolation of insulin the object of treatment in diabetes was to keep the blood-sugar below 0.180 per cent, for values above this led to failure of insulin production, and, therefore, failure to utilize glucose. This is the real explanation of the insulin treatment of hyperthyroidism; it is of value, but frequent injections are not desirable in such apprehensive patients.

This action on carbohydrate metabolism and the similarity of diabetes and hyperthyroidism as regards wasting, thirst, bulimia, glycosuria, and hyperglycæmia bring the two diseases very near together. In diabetes diet is regarded as of paramount importance, but in hyperthyroidism diet tends to be ignored. Apart from the evidence of the value of correct diet given so far, much more is obtainable McCarrison<sup>10</sup> has shown that excess of fats, some fatty acids and

protem cause hyperplasia of the thyroid; that a high carbohydrate diet tends to reverse these changes. He has shown that deficiency of any or all of the vitamins increases the incidence of goitre in rats on a diet containing too little carbohydrate, and that excess of vitamins and onions protect animals from goitre.

The altered metabolism of hyperthyroidism gives us the following indications for treatment:—The abnormal muscular metabolism demands as complete rest as possible, and an increase of iodine intake; excess of adrenaline requires sedatives and freedom from emotion and excitement; since deficiency of vitamins induces thyroid hyperplasia, an excess of vitamins appears to be indicated; as carbohydrate excess diminishes thyroid activity, the diet should be rich in carbohydrate; the excessive glycogenolysis should be combated by any means in our power, otherwise depression of endogenous insulin, and failure to utilize glucose, will continue.

*Rest.*—This should be absolute rest in bed until weight has nearly been regained and the pulse and eye signs are normal. If sleep is poor, bromides should be allowed in adequate dosage; *cannabis indica* increases the effect of bromide. When the signs become favourable, the patient is allowed out of bed for a few minutes daily, and this time is very gradually increased if pulse and weight remain favourable. The adrenal factor demands as complete freedom from emotional stimuli as possible. The manner of the physician is of importance; he should be quiet, confident, and not in a hurry. Quietness of the surroundings is of considerable importance; our hospitals, as a rule, are very noisy places. I am convinced that if home conditions are medium to good, these patients do better at home. Half of the last series, even some cases of severe degree, have been treated throughout as out-patients, and without exception they have done well.

*Diet*—As I hope to have shown, this is of prime

importance. The diet should consist of fruits, vegetables, sugars and starches. Fat is supplied only in the form of butter. Nitrogen of animal origin is given as gravies, to make the vegetables more palatable, as fruit or meat jellies, and a very small helping of some flesh about every second day. Eggs, milk and other milk products than butter are not allowed. McCarrison has shown that onions are of use in preventing goitre in animals on a goitre diet; how they act is not known. Onions are rich in certain sulphur compounds, these give the onion its special flavour; it may be that these compounds, like sulphur parenterally, increase hepatic glycogen. Onions, raw if tolerated, otherwise boiled, are given daily; boiled onions at night appear to help sleep, and the patients so far have rather welcomed them.

*Vitamins.*—Excess of vitamins *A* and *D* is obtained by giving three tablets of ostelin daily. Bemax, a tablespoonful daily, yields enough of vitamins *B* and *E*. The diet, consisting of excess fruit and vegetables, already gives an abundance of vitamin *C*.

Depression of thyroid activity by X-radiation has now been discontinued; about thirty cases have been treated with X-rays plus the rest of the treatment. It is sometimes said that X-radiation may make subsequent surgical intervention more difficult; but no case so treated here has ever needed surgical aid. X-radiation of the adrenals is claimed to give good results, as would be expected; in passing it may be noted that X-radiation of the adrenals is also benefiting cases of diabetes,<sup>11</sup> for the same reason—diminution of glycogenolysis from lessening of adrenaline. It has been noted that X-radiation of the mid-brain is also giving results.

*The supply of iodine*—This has been difficult until recently. Mild cases of hyperthyroidism do well on iodine medication, but the severe grades mostly do well for a week or two. This is termed the iodine

remission, but it is transient, and when it has passed the patient is often worse off than before. Certain French schools consider that this is due to tolerance, and steadily increase the dose until enormous amounts are given; they claim good results. Until recently iodine was withheld, except from one patient who could not afford the time necessary for medical treatment on financial grounds; this patient had only six weeks in which to recover sufficiently for light work, and at that time we required about six months for medical treatment. Now we should regard six weeks as short, but possible. Owing to the addition of fluoride we have no difficulty in supplying iodine; fluoride perpetuates the iodine remission.

*Fluoride.*—This was first used by Goldemberg, of Buenos Aires.<sup>9</sup> He reported that it was useful and gave a short account of seven cases, but he gave no explanation as to why it was of use. As two of the four halogens, bromine and iodine, are accorded valuable in the treatment of hyperthyroidism, it appeared worth while to try fluoride. Goldemberg reported that sodium fluoride was usually tolerated badly, and he used the ammonium salt. I commenced to use sodium fluoride early in 1931, just after Goldemberg's publication; fluoride was added to the rest of the treatment. It was found that each patient shortly experienced symptoms of toxicity, just as Goldemberg had described. These symptoms suggested that the salt irritated the upper part of the small intestine; therefore astringents were added to the solution and it was then readily tolerated and the amount could be steadily increased. It has been continuously administered to several of the patients for nearly a year, to their benefit.

One patient only failed to respond, in spite of all treatment she lost weight at an alarming rate—she dropped to 5 stones. As this looked like being a failure, iodine, as Lugol's solution, was added to the fluoride, to get an iodine remission in which to consider opera-



tion The patient refused, however, but the iodine remission persisted, and she put on weight at a rapid rate

Since that case, iodine has been added to the fluoride in all the series, and there has been a remarkable speeding up of recovery

*Action of fluoride.*—Of this little is known. It has been used as an anti-coagulant; it is used as a safe preservative of milk products, beer and wines; it is largely used in insecticides for lice, cockroaches and flies especially. In toxicology it is known to cause fatal cachexia in cattle feeding on pastures contaminated by the fluoride in the smoke of chemical factories, it also causes a condition similar to osteomalacia, with spontaneous fractures in cattle and laboratory animals. No human cases of poisoning have been reported, even from the factories responsible for the veterinary cases<sup>12</sup> An experiment on cancer tissue<sup>13</sup> may throw a little light on the utility of fluoride; it was reported that the addition of fluoride to living cancer tissue, *in vitro*, occasioned a diminution of glycolysis and lactic acid production. This pointed to the possibility of fluoride acting by lessening glycolysis, which we have seen is excessive in hyperthyroidism. I have had some experiments carried out to determine whether there was any evidence for this supposition; for the actual carrying out of the chemical and experimental work I have to thank Dr. D. Stone and Miss Keyser.

We fed mice and rabbits on the highest tolerated dose of thyroid extract, and in some cases also injected thyroxin, this was continued for two to three weeks The animals were divided into two equal batches, the controls were fed with sodium chloride, the others on a tolerated daily dose of sodium fluoride At the end of the period blood-sugar curves were made in the rabbits, not in the mice, then the animals were killed and glycogen estimations carried out on liver and muscles Fluoride tends to lessen hyperglycæmia induced by thyroid feeding in rabbits, but the action is not marked We find that fluoride tends to cause increase in hepatic glycogen in mice and rabbits fed on large doses of thyroid, but we cannot find any action on the glycogen of muscle, which includes heart muscle The figures are based on twenty mice and twelve rabbits. These results are given with reserve, as the experiments are too few for certainty This experimental finding may indicate that fluoride acts by break-

ing the vicious circle between liver, thyroid and adrenal

There may be other explanations. Thus, Goldemberg<sup>9</sup> noted transient diabetes insipidus in humans treated too intensely by intravenous ammonium fluoride; this suggests that it might act by depressing the over-active mid-brain centres noted above. Another possible explanation is that it acts as an intestinal antiseptic; McCarrison,<sup>2</sup> following his demonstration of enteric infection in goitre, advised treatment by large doses of thymol, on account of its antiseptic action. Much more experimental work will have to be done before we shall know definitely how fluoride exerts its action.

*Toxicity of fluoride.*—Cristiani<sup>12</sup> gives the lethal dose, administered at one time, as 7.5 grains per kilo. of guinea pig; this works out to about 1 oz. for an average adult human. We have fed mice for weeks, and a week for a mouse corresponds nearly to a year for a man, with a dosage of fluoride which would correspond to 1 drachm a day for a human adult; these mice showed no ill-effects. When the dose was doubled, the animals became ill, but recovered when fluoride was stopped; it should be noted that we did not add the chlorodyne and catechu to this fluoride for the mice. Rabbits tolerated rather less fluoride than mice, and reacted in much the same manner. The average effective dose in human therapeutics works out as about  $1\frac{1}{2}$  grains per day; this is considerably less than the toxic dose; much greater doses have been added to milk and wines without any toxic effects being noted, as fluoride is regarded as being a safe preservative

*Conclusions.*—These conclusions are based on fifty-three cases; the fate of two cases is not known; the other cases have slowly recovered. Since fluoride was introduced sixteen cases, mostly of severe grade, have been treated; these have recovered, or are recovering much more quickly. Then since iodine has been added to fluoride the more recent cases have responded still more

rapidly. It requires about two weeks to get the remission, and so far this remission has persisted.

The duration of medical treatment has been considerably shortened. At first I told the patient to wait and see; later that treatment would have to be continued for six months, but told the practitioner in charge that a second six months would probably be required. Last year it was said that results from medical treatment were quite as effective as those from surgery, but that much longer time was necessary. Now we can get the iodine remission in about two weeks, and a further two weeks only is required to convince the patient that she is on the road to recovery. At about six weeks from the start, the patient has a good chance of being allowed up, and progress is therefore fairly rapid. Surgery requires two to three weeks of pre-operative treatment, and as much again, or longer, to recover from operation; there is, therefore, not much to be said for surgical saving of time now. Though the mortality is claimed to be low for operation carried out by surgeons of great experience in hyperthyroidism, it is said that it is not low for general surgeons. As I have been a practical pathologist, I am inclined to distrust surgical (and medical) statistics; there are too many uncredited "extras." In this series there have been no deaths, or any indication of the likelihood of deaths; but the total number of cases is too small for certainty.

*The administration of fluoride.*—Two solutions are advised, as their mixture produces an unpleasant deposit :—

R	2 per cent aqueous solution of sodium fluoride	-	m xxx
	Lugol's iodine	- - - - -	m x
	Water	- - - - -	to 3i

R	Chlorodyne	- - - - -	m v
	Tincture of catechu	- - - - -	m xv
	Simple syrup	- - - - -	m xx
	Water	- - - - -	to 3i

These two are mixed in equal parts and taken

immediately after meals thrice daily. It is best to begin with half the amount of the first, but full amount of the second for a few days; then gradually increase until equal parts are taken. When well tolerated, the amount of both is increased; we have not yet increased beyond  $1\frac{1}{2}$  drachms, as cases have responded well.

The problem of the best time to deal with sepsis is considered to be of causal importance. Dental or tonsillar sepsis has been treated palliatively until the patient has practically recovered from hyperthyroid symptoms.

*Summary*—The pathogeny of hyperthyroidism is reviewed and indications for medical treatment are demonstrated. A simple system of treatment is given which appears to be fairly rapidly effective, even in severe cases. No case treated on these lines has failed to improve up to the present, although at least half of the cases had been told by competent consultants that operative treatment was imperative to save life.

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- <sup>14</sup> Crew, F A E, Wiesner, B P *Brit Med Journ*, 1930, i, 777

addicts, in many instances, constitute a body of persons more susceptible to the lure of narcotics than ever before, but behind them in reserve is the vast army of psychopaths ripe and ready for their first addiction when circumstances are favourable. An army is not destroyed when its reserves are intact. For some time to come, perhaps for all time, it will be vastly more important to prevent the making of an addict than to cure him when made. It is scarcely a paradox to say that the best way to be cured of addiction is not to become an addict, and that the best amethyst against addiction is the possession of a normal psyche.

What, then, can the individual practitioner do by way of prevention? He can see to it that no addict is created by any fault of his own. He can remember that there are pain-relieving drugs other than morphine, etc., which have their place in suitable circumstances. He can remember, with Levinstein,<sup>4</sup> that the history of morphinism dates from the invention of the syringe, and see to it that the patient himself is never entrusted with the instrument. Moreover, the addict physician is a menace wherever he is found, and, unfortunately, owing to special opportunities, addiction has claimed many victims among the members of our own profession. In this direction, therefore, prevention begins at home. The practitioner can also act with special caution when ordering narcotic drugs to unstable persons. He can read, re-read and put into practice the wise advice given by the Departmental Committee on Morphine and Heroin Addiction in sections 56-60 of their report.<sup>5</sup> The family physician is also, as Romer remarks,<sup>6</sup> in a specially favourable position to recognize early the beginning of functional nervous and physical disorders which are so often of tardy development and which may be amenable to treatment in their early stages. He may thus be able in some cases to prevent the development of a condition

which creates a predisposition in the patient to resort to narcotics, and so play an important part in prophylaxis. In short, he both has and can create many opportunities for contributing towards prevention of addiction. The reader who wishes to pursue the subject further would do well to consult a series of articles on the "Indispensable uses of Narcotics," which appeared weekly from 14 March to 6 June, 1931, in *The Journal of the American Medical Association*.

In connection with this important matter of the prevention of addiction, it is interesting to note that recently the Committee on Drug Addiction of the National Research Council in the United States have commenced an extensive collaborative research in alkaloidal chemistry by chemists and pharmacologists with a view to preparing, if possible, a non-habit-forming substitute for morphine that would yet possess the desirable actions of morphine. It is greatly to be hoped that their somewhat Herculean labour will be crowned with success.

But when addiction actually exists, every means must be used to free the patient from his bondage, though the prognosis of addiction, save in certain cases, is not hopeful. The statistics are gloomy and depressing. Yet it is not for the practitioner to base his therapeutics, as Mr. Bertrand Russell does his philosophy, "on the firm foundations of unyielding despair." Statistics are depressing, it is true, but any given patient is not to be considered as a possible future unit of a statistical table, but a fellow-being urgently in need of all the help that can be given. That physician will succeed best who is wisely foolish and assumes that every addict genuinely wishes to be cured, and is curable, until the contrary is definitely proved.

It was once said that the gravity of a disease may be gauged by the number of cures for it. The more "cures" the more incurable it is. Judged by this criterion, addiction is a very serious disease indeed.

There are hundreds of cures for it, and they are ever being augmented. Even in a little country like Denmark we are told by Larsen<sup>s</sup> that during the year 1930 no less than ten new methods for the treatment of chronic morphinism were tried. This article does not pretend either to enumerate or evaluate all the varied methods which have been put forward or which are now in use, nor is it intended to lay down any definite principles for individual cases. But it may be worth while to take a bird's-eye view of the methods in vogue in various parts of the world in the hope that the experience of the many may correct and amplify the experience of the one. It must first be remembered, however, that the complete treatment of addiction comprises two distinct stages, namely : (1) disintoxication, and (2) rehabilitation, and of these the latter is far the more important as well as far the more difficult. There are scores of methods which will free the addict from his drug, but by what method can we free him from himself?

(1) *Disintoxication.*

By disintoxication, then, is meant the freeing of the addict from his poison or, in other words, the withdrawal of the drug, either suddenly or gradually—followed by measures directed to the restoration of his health, at least from the physical standpoint. By rehabilitation is meant no less than the re-creation of the personality, for it is only when this is done, or can be done, that the possibility of relapse is eliminated. First, then, we have to enumerate the many methods which have been devised with a view to disintoxication. The following table is an attempt to classify those methods :—

(A) *The ambulatory method.*

(B) *Methods devised to secure withdrawal within a limited period.*—

(1) The abrupt (sudden) withdrawal method : (a) abrupt withdrawal without special measures (“cold

turkey"); (b) abrupt withdrawal under hypnosis; (c) abrupt withdrawal assisted by drugs of the atropine series; (d) abrupt withdrawal assisted by "specific" treatment (e.g. "narcosan," vegetable proteins, antibodies); (e) abrupt withdrawal with special symptomatic treatment (e.g. by means of euphyllin or insulin).

(2) Rapid withdrawal methods: (a) rapid withdrawal with injections of autogenous serum; (b) rapid withdrawal aided by drugs of the opium series; (c) rapid withdrawal under treatment by endocrine preparations; (d) rapid withdrawal under light anæsthesia; (e) rapid withdrawal under drugs of the atropine series.

(3) The gradual reduction method.

(C) *Treatment by the "conditioned reflex" method.*

It is to be understood that not all the special subgroups are necessarily clean-cut. Thus, one may be combined with another in an almost endless series of permutations. However, it is hoped that the scheme may prove a useful general guide, and it will certainly facilitate description.

#### THE AMBULATORY METHOD

The so-called "ambulatory method" is the one which will of necessity be most frequently employed by the non-specialist practitioner in this country, and we will begin by describing it. The ambulatory method of treatment may be defined as one in which the patient is free to go about as he pleases and receives from the practitioner (either in material or indirectly by means of a prescription), and under his instructions, such quantities of his narcotic drug for self-administration as are deemed to be necessary. The object aimed at is gradually to reduce the amount of morphine, heroin, etc., so that with the least possible discomfort it can ultimately be withdrawn altogether, or reduced to a certain minimum quantity.

The "ambulatory" treatment is not, properly



speaking, a disintoxication treatment at all, that is to say, only rarely is it possible entirely to withdraw the drug from the patient while he is completely at liberty. It is too much to say that this can never be done—in a few, though very few cases, it has been accomplished. But it is true that the most that can usually be hoped for is a gradual reduction of the amount taken to a minimum point and, in some cases, all that can be accomplished is to prevent an increase in the dose habitually taken. On this account, nothing too bad can be said of it by some authorities, and in certain countries it is nominally forbidden altogether. But, viewing the matter from a commonsense standpoint, it is better than nothing when the choice is between it and nothing as, in present circumstances, is so often the case. Something may be accomplished, if not always very much, provided that the practitioner possesses the requisite gifts of skill and personality. Unless and until, therefore, it be possible for the various countries to provide sufficient accommodation for institutional treatment and bring it within the reach of all addicts, rich or poor, and, if necessary, adopt compulsory measures, the very imperfect ambulatory method is all that is at the disposal of the physician in many instances. Is it wise to reject even a tenth best when all higher grades of the best are unattainable?

#### METHODS DEVISED TO SECURE WITHDRAWAL WITHIN A LIMITED PERIOD

The method of abrupt withdrawal has had a somewhat chequered career. It is of German origin and seems to have been first systematically tried by Levinstein, who reported his results in 1875.<sup>4</sup> As a result of his advocacy, some converts were made, both in his own country and in others, the apparent simplicity of the treatment being its chief commendation. However, it was a severe procedure and it gradually fell

into disfavour. Clifford Allbutt, writing in 1912, seems to have assumed that it was not likely to be revived. This has not proved to be the case; since he wrote, the practice of withdrawing the addiction drug in one cut has found an increasing number of advocates in many countries. It has, for instance, some enthusiastic exponents in the United States, Canada, France, Denmark, the Netherlands, and elsewhere, while in the land of its origin it seems rapidly to be becoming the method of choice, if we accept the results of a questionnaire sent by Wolff to all the German provincial hospitals, nursing homes, and psychiatric clinics, as well as to private institutions and some individual doctors. He also made some inquiries in Austria and Switzerland. His results showed that out of 198 answers, 90 expressed a preference for this method and a further 24 were in favour of it, with certain reservations. Eighteen out of 24 University clinics used or preferred it. But though opinion was thus generally favourable, we may note that some of the replies received by Wolff were distinctly adverse.<sup>9</sup>

Some of the supporters of abrupt withdrawal are of opinion that the psychic factor is an important element in the production of the withdrawal symptoms. Thus Nellans and Massee<sup>10</sup> state that the absolute certainty which the patient has that he will receive no more "junk," regardless of consequences, is perhaps the most important therapeutic agent we have and, as regards the alleged danger of sudden withdrawal, they can only reiterate that the method has, in their experience, been a perfectly safe procedure. Chopra also states that his work in the gaols shows that the addicts, being fully aware that they could get no more of the drug, showed no marked abstention symptoms, which circumstance confirms him in his opinion that there is a large psychic element, in addition to the physical element in the production of the symptoms.<sup>11</sup> Light also inclines to this view, though he acknowledges

that the subject requires further study.<sup>12</sup> On the other hand, some recent work of Kolb and Du Mez on monkeys seems clearly to show that this psychical explanation must not be pressed too far and that not all the withdrawal symptoms can adequately be explained on this theory.<sup>13</sup> It is best to avoid any undue dogmatism at present

In America, especially, some surprisingly good results have been reported from abrupt withdrawal by various physicians. Scelesh and Kuh, for example, treated 5,000 cases of morphinism in this way and encountered no serious withdrawal or asthenic symptoms and had no deaths.<sup>14</sup> Nevertheless, the contrary experience of other equally good observers must be respected and British opinion is, with a few notable exceptions, against the employment of so stark a method. The witnesses examined by the Departmental Committee, save one eminent authority and some of the medical officers of H.M. Prisons, were emphatic in their disapproval. They regarded it as dangerous and did not agree with those who state that relapse is less frequent with the abrupt than with the milder procedures. In this they are not without support, for one of Wolff's respondents, a very experienced psychiatrist, gave it as his experience that the permanent results of the sudden method were very bad and that there was a strong tendency to relapse. Nor do the statistics furnished by Nellans and Masee encourage the belief that relapse is less frequent than with milder methods. In this connection, also, we may quote the remarks of G. Laughton Scott,<sup>15</sup> in his recent book, *The Morphine Habit*. He regards the avoidance of "withdrawal shock" as playing an important part in the ultimate issue, and thinks there is no doubt that an easy withdrawal is "calculated to diminish the tendency to relapse." Relapse is only too common with any method, and as denarcotization is only the first and easiest step towards cure, it appears unjusti-

fiable to cause unnecessary suffering by employing as a routine the harsher treatments. No doubt, circumstances alter cases, and no criticism is intended of those who find that the complete and abrupt cut is successful in their hands, but in this country it has not been found, generally speaking, that the abrupt method presents sufficient advantages to outweigh its difficulties and drawbacks.

It goes without saying that so drastic a method can only be carried out in a special institution provided with a skilled staff of nurses and physicians. It is interesting to note that some of the best results were obtained in prisons. Friedlander holds that withdrawal without compulsion is impossible and that if it be attempted in a non-detention hospital there is relapse in 90 per cent. of the cases and the treatment leads to disillusion on the part of both patient and practitioner.<sup>16</sup> No one has ever recommended the procedure as suitable for employment while the patient is at large, and even its most enthusiastic advocates recognize that it is contra-indicated in cases in which the patient is old, feeble, or suffering from actual organic disease of any kind. Some also would regard sudden withdrawal as contra-indicated where the addiction has been of very long duration, though others do not regard this circumstance as necessarily a negative indication. On the other hand, even thoroughgoing opponents of the measure would generally admit that in certain specially selected cases it may be the treatment of choice, provided that the institution chosen for the reception of the patient is in every way adequate. The various forms of abrupt withdrawal now call for some consideration.

(a) *Abrupt withdrawal without special measures* — In its simplest form, the drug is abruptly and completely withdrawn from the addict. No special drugs are used, but the patient is put to bed for the first few days and is helped by skilled nursing and remedial

measures of a general character. Free, but not excessive, purgation is employed, and baths and massage may be useful. An essential factor in the treatment is the knowledge of the patient that he will get no further dose of his narcotic whatever happens. Diarrhœa, sickness, etc., are treated on general lines. Insomnia is met by some simple hypnotic, such as paraldehyde. Collapse is combated by the employment of cardiac tonics, and so on. In the very rare cases in which collapse is so severe that the patient's life appears actually to be in danger, a small dose of morphine is given. Yet it is surprising to read how seldom this exception is necessary. Some observers have treated hundreds of cases by abrupt withdrawal and have never had to resort to a further administration of the drug in any circumstances. It is the usual experience that the worst is over in about 48-72 hours, and in eight to ten days the patients are well on their way to recovery, in so far as the physical side is concerned. Good descriptions of this "cold turkey" method with all essential details are given in the papers of Richards<sup>17</sup> and Nellans and Massee.<sup>10</sup>

(b) *Abrupt withdrawal with intensive use of hypnotics.*—More commonly, however, some special form of treatment or some special drugs are used. Certain physicians use a very interesting modification in which, so to speak, the withdrawal is treated as a kind of surgical operation to be conducted under anæsthesia, or, more correctly, under hypnosis. The withdrawal symptoms, as van Otterloo and Linn put it, are "veiled by means of sleep"<sup>18</sup>. A whole battery of drugs has been used for this purpose by different exponents of the method: paraldehyde, somnifen, sodium luminal, and other barbiturates, amylene hydrate, pernocton, etc.—we have no space to enter into the details of all these processes and the method is not without danger. Those interested may consult the paper by van Otterloo and Linn just mentioned and also those of Schlomer<sup>19</sup>.

and Herold.<sup>20</sup> A modification of the "sleep method" described by Neuberger deserves, however, fuller mention. He employs a light chloroform narcosis, much in the same way as in midwifery cases.<sup>21</sup> Properly speaking, this author's method is not abrupt withdrawal, but a rapid one (*accélérée*), yet we will describe it here, for convenience sake, in order to complete this account of the hypnotic withdrawal methods. The chloroform is used to combat "the state of need" and a condition of semi-narcosis renders the deprivation of the drug supportable. The paroxysms of craving are treated in the same way as the pains of childbirth often are, and whiffs of the anæsthetic are given from time to time so as to secure a light narcosis.

The author calls it *anesthésie à la reine*. The chloroform is given from a drop-bottle on a compress, and is administered whenever the patient feels the urge of his craving. The method, as might be expected, requires close attention on the part of both practitioner and nurse. The dose of morphine, etc., is quite quickly reduced, the chloroform inhalations taking the place of the drug very efficiently.

(c) *Abrupt withdrawal assisted by drugs of the atropine series.*—The drugs employed in this modification are scopolamine, hyoscine, and atropine. Here will be described the scopolamine treatment as carried out at the Philadelphia General Hospital by Light and Torrance as it furnishes a good example of the general management of cases treated by this method:—

Before the addiction drug is entirely cut off, the patient is for the first twenty-four hours given morphine sulphate hypodermically in sufficient quantities to prevent withdrawal symptoms. He is placed upon a liquid diet for this period and given a mild dose of calomel or mercury, followed in eight hours by a saline cathartic. At the end of the twenty-four hour period, three doses of scopolamine hydrobromide 1/200 gr. are administered hypodermically at four-hourly intervals. With each dose is given 1/40th grain of strychnine. Then a few more injections of scopolamine are given, the dose being gradually raised to 1/100 gr. and, at the end of 36 hours, the drug is stopped. When the effects of the scopolamine begin to disappear, large doses of phenobarbital are given if the withdrawal symptoms

are still quite severe, or a single dose of  $\frac{1}{4}$  grain of morphine is administered. From this time on treatment is purely symptomatic, consisting chiefly of sedatives to promote sleep and sodium bicarbonate for any gastric distress. The patients are usually discharged at the end of ten days.

On the results the authors frankly remark: "It is our opinion from the number of addicts who have come to us from other institutions and the fact that 50 per cent. come back to us for another treatment, that present methods, including our own, leave much to be desired."<sup>22</sup>

As to the atropine and hyoscine treatments, Lambert, who tested them under strict control conditions, reports unfavourably upon them: the patients suffered quite as much as when the sudden withdrawal was unassisted by these drugs.<sup>23a</sup> In another paper he refers to his results with scopolamine which were also disappointing.<sup>23b</sup>

(d) *Abrupt withdrawal with "specific" treatment.*—By "specific" treatment we here mean a general treatment based on some definite theory or hypothesis as to the nature of the withdrawal symptoms. One of these treatments which has attracted a good deal of attention and concerning which many papers have been written is conducted with a preparation termed "narcosan." Narcosan is stated to be a solution of lipoids, proteins and water-soluble vitamins. The lipoids are obtained from soya beans and cotton seeds, the proteins from alfalfa seeds or Hungarian millet, and the vitamins from various plant seeds. Narcosan was first brought into prominence by Lambert and Tilney in a paper published in 1926.<sup>24</sup> They state: "the theory of action of narcosan in the body is that narcotics, such as morphine, call forth in the body certain protective substances to neutralize them. If the narcotics be suddenly withdrawn, and not given, these neutralizing substances are themselves toxic to the body. The lipoids in narcosan neutralize the toxic substances in place of the narcotic." The theory

that alkaloids can act as antigens is, however, discredited by very excellent authorities.

Martin and Williams<sup>25</sup> think that the action of narcosan may be explained by the presence in it of certain non-specific vegetable proteins which may stimulate the endocrine glands. They themselves did not use narcosan, but a preparation of alfalfa protein which they combined with orchitic substance in the case of male and an ovarian hormone in the case of female patients. They state that their results were very gratifying. The patients suffered little, and nursing was minimized. Though they used alfalfa, they see no reason why the proteins should not be derived from millet, rape, hemp-seed, etc. In a further communication (1930) they report that their "proteal" treatment has continued to give very satisfactory results, but they now supplement the proteal and sex-hormone preparation by adrenal cortex preparations.<sup>26</sup> The history of the controversy over narcosan is most instructive, and readers who care to pursue it may consult the papers already mentioned and also those of Schieb,<sup>27</sup> Nellans and Masee,<sup>10</sup> some later papers of Lambert<sup>23a & b</sup>, and Johnson.<sup>28</sup> Another interesting "specific" treatment is that with blister serum, advocated by Modinos, and will be described under "rapid withdrawal."<sup>29</sup>

(e) *Abrupt withdrawal with special symptomatic treatment*—In some varieties of the abrupt method special drugs are used which by virtue of their peculiar properties are credited with the power of removing or alleviating certain of the distressing abstinence symptoms. We will mention here two of the most recent procedures, viz., the use of euphyllin and of insulin.

In a recent paper, Alexandra Adler has advocated the injection of euphyllin (theophylline-ethylene-diamine) to relieve the withdrawal symptoms, basing her therapeutics on Barbour, Hunter and Richey's<sup>30</sup> observations that morphine withdrawal induced hydration



of the blood and probably of the tissues in general.<sup>31</sup> She believes that the clinical picture of the abstinence symptoms resembles the "water poisoning" described by Rowntree.<sup>56</sup> The euphyllin, a powerful diuretic, is given by intragluteal injection or, if that is badly tolerated, by intravenous injection (arm). The dose used is 0.48 grm., and the injections are given daily, morning and evening, for from 3-10 days according to the severity of the symptoms. The results in twelve cases are reported and were considered eminently satisfactory. Further trials are obviously necessary before an evaluation of the method is possible.

Of late, the use of insulin to mitigate the symptoms of withdrawal by the sudden process has been tried in Germany, Switzerland, Denmark, and is, we believe, also in use in this country. In 1928, Hirsch<sup>32</sup> wrote that he found a low blood-sugar value in the withdrawal period and he claimed good results by injecting grape-sugar solutions. Somewhat later, Anton and Jacobi<sup>33</sup> used insulin and grape sugar with favourable results. Sakel, in 1930,<sup>34</sup> used insulin alone, which he gave in doses up to 80 units in the 24 hours, but he regulated the dose according to the severity of the withdrawal symptoms. The insulin was given for 6-8 days, and the morphine was cut off from the start. He had no failures in the 15 cases he treated, and reported that in all the patients the somatic symptoms (vomiting, anorexia, and diarrhoea) were cut short with absolute certainty, and the psychic symptoms were also very favourably influenced. He met with no case of insulin shock. By means of control experiments he deduced that the effect of the insulin was a real one and not merely a mental result of the injections. Larsen<sup>8</sup> states that Danish experience of the procedure is very favourable, and he also stresses the absence of anorexia. More recently still (1931) F. Braun<sup>35</sup> gives his experience of the plan in six severe cases of addiction.

He gave up to 100 units a day and employed soporifics as well

(luminal, etc.). Free intake of fluids is recommended. In all the patients the morphine was abruptly withdrawn, the insulin taking its place and, in all, the effect was striking. "Immediate tranquillity" was noted after each injection. Braun does not claim, however, that insulin removes every abstinence symptom, but that by its use the abstinence troubles are rendered of short duration and quite tolerable. "We gave them the injections whenever they became restless and demanded them. All felt as though transformed, revived, which was certainly not only caused by a psychogenic reaction." Hypoglycæmic symptoms were either absent or only set in when the abstinence symptoms of withdrawal had already vanished.

Sugar solutions were, therefore, either completely dispensed with or only prescribed after the subsidence of the acute symptoms, i.e. on the third and fourth days, the insulin dosage still continuing.

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(To be concluded)

# Sea-sickness

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THE consensus of considered opinion is that the primary cause of sea-sickness is a derangement of the labyrinthine function. Many problems are said to be left unanswered by this conception, so this presentation is intended to show that every important feature associated with sea-sickness and which seems to have an independent status is either secondary or accessory to the vestibule. The great variety of views on the nature of sea-sickness arises partly from a resistance to accept an association so remote as that of a derangement of function with symptoms such as nausea, and signs such as a fall of blood pressure, so the search continues for some more direct and, needless to say, more specious relationship. The first task, then, in an exposition of sea-sickness must be to link up the various types, the known signs and symptoms, and explain their relationship through a common origin. With this in view it is perhaps well to discuss certain prevailing views before venturing on re-stating the labyrinthine theory.

*Ketosis.*—The presence of ketosis, prior to the onset of vomiting along with the apparent relief of symptoms by the indicated treatment of alkalis and glucose, has led to the opinion that ketosis, if not the cause of sea-sickness, is yet a contributory antecedent. Ketosis, however, only occasionally presents itself in this *time* relation, though it frequently follows vomiting.<sup>1</sup> It is, indeed, questionable whether the cases which exhibit the pre-vomiting ketosis are so-called “bad” cases or even display an unusual susceptibility to sea-sickness. What is very certain is that acknowledged cases of diabetes mellitus, among passengers and crew, who

with the portholes closed against the heavy seas. The diminution of oxygen in these circumstances is far too trifling to cause the least appreciable effect. What has apparently been overlooked is that these circumstances of poor ventilation, of high humidity and of heat, are all calculated to act adversely by increasing both the lassitude and headache so common in sea-sick cases.

*Visceral factor.*—The danger of attaching too much importance to certain local symptoms and signs is again evident in the rather common but naïve opinion that the obvious place where the maximum effect of the imposed movement will be felt is the abdominal viscera. Attention is directed entirely to the manifest derangement of the stomach, the sinking sensation, the nausea and vomiting. Other equally important symptoms of sea-sickness, such as vertigo, mental confusion, lassitude, headache, blurred vision, skin reactions, and so on, are not considered as also requiring explanation. It is pointed out how nearly related in time these sensations of sinking and nausea are to certain phases of ship movement, so much so as to suggest a causal connection. The maximum effect of this movement takes place, as might be expected, not during the roll or pitch, but at the moment of acceleration, and still more at the moment of retardation and change of direction. The viscera of the abdomen are relatively mobile, and are therefore more liable than the rest of the body to be affected by these abrupt changes, when the whole body is thus subjected to movement. For the same reason the changes of pressure are thought to affect the liver by causing alternating congestion and anæmia. No evidence of this is produced and there is no reason to assume that if this were so the condition would result in the symptoms associated with sea-sickness.

A. E. Barclay<sup>2</sup> has collected a number of examples of the intimate connection between central or psychic

causes and immediate visceral reactions. By screening opaque meals in the stomach he was able to demonstrate the almost instantaneous reaction in the gastric tonus to certain psychic stimuli. To the banging of a door in the case of a highly nervous woman the immediate result was that the lower border of the stomach dropped three inches. A disgusting odour presented to another subject caused a drop of an inch or more in a normal stomach. On the other hand, the suggestion of a glass of beer to a workman was, as Barclay graphically describes it, sufficient to cause the stomach at once "to tuck up its skirts." Moderate rotations in the Bárány chair, as far as the faulty method of percussion can determine, cause in susceptible cases a fall of the stomach, but fail to do so in those who are not susceptible.

One thing, however, to bear in mind is that the visceral reflex, causing a drop in the stomach, will have its repercussion on the feeling of gastric disturbance. If there is in addition to this a direct local effect on the stomach, negligible in itself, by the movement of the boat, the visceral reflex will be re-enforced. As a result of this consideration we learn that the belly-binder so frequently advocated may itself give a little relief by restricting the stomach's freedom to drop, and may thus slightly mitigate the local symptoms.

*The suggestible type.*—The readiness with which certain subjects succumb to sea-sickness at the instance of almost any kind of signalizer, odour of the galley or even a view of the sea, the readiness on the other hand with which some respond to exhortation and mental diversion, calls for remark, and has led to the belief in the all-importance of the psychic factor. Certain subjects not usually sensitive to unpleasant odours are, nevertheless, nauseated and vomit to the specific odour of the galley, or of burnt engine-oil on board ship. Like those who vomit on ascending the gangway they respond to a suggestion which has an overwhelmingly unpleasant association. The odour

of burnt oil or sight of the gangway reawakens vividly the memory of symptoms of sea-sickness which occupy the mind to the exclusion of everything else and pass from imagery to actuality.

The experienced ship's surgeon<sup>3</sup> always strongly advises his susceptible passengers to engage themselves in exercise, whether dancing (not waltzing), deck sports or drill, as soon as possible before lassitude sets in. If they are too overcome he has, of course, no alternative than to suggest the correct decubitus with reference to the ship's movement, his object then will be to mitigate as far as possible the effect of the ship's motion

*Ocular factor.*—In endeavouring to analyse the symptoms of sea-sickness and refer them to their rightful source, it is inevitable that attention should be drawn to any features that can be defined or discriminated. As the avenue of perceived disorder the eye for this reason has been given a greater importance than it deserves. The unpleasant sensation of wavering uncertainty in the visual field cannot be ascribed to the eye, since the objective disorder, in so far as it is merely visual, is, in fact, negligible. The apparent disorder in the visual field is almost entirely due to the projection of the disorders of deviation, excited in the extra-ocular muscles by the vestibule, and may, for that reason, contribute to the general dilemma. In examples such as sea and air sickness, swing sickness, even train and motor-car sickness, the movement is never merely objective to the field of vision, the movement affects the body as a whole and its many receptors. Train and car sickness are instanced as typical examples of visual irritation only, yet the blind are not exempt from either motor or train sickness.

The function of the eye can be studied from two points of view, the first may be termed its intrinsic and purely exteroceptor function, when its movements are determined by light or light movement stimuli in the visual field, and also by objects in the visual field

determined by interest. The second function may be termed extrinsic because the eye movements are not determined by objects in the visual field, light stimuli or objects of interest, but by impulses received from other parts of the body, which serve the function of equilibrium. The extra-ocular muscles receive functionally useful static and stato-kinetic impulses from the vestibule, the neck and body. The vestibule, in certain circumstances to be explained later, also sends impulses which cause disorientation to the eyes, neck, body and limbs. These reactions are called the primary reactions of vestibular dysfunction; that relating to the eye, the primary reaction of nystagmus.

Reverting to the examples of train and car sickness, emphasis is laid on the presence of nystagmus, which occurs on looking at the passing landscape. Nystagmus is generally associated with vertigo, and it is contended, therefore, that the symptoms of train and car sickness are the result of this ocular excitation. Nystagmus, so far as its merely optic, is almost immediately stopped by closure of the eyes or turning the eyes away from the landscape. Optic nystagmus, if vertiginous at all, is only slightly so. It is best elicited in the experiment of the rotating drum, which, the subject seated, follows with his eyes. He suffers no noticeable discomfort and does not complain of vertigo. It is clear that the eyes are alone involved, in their intrinsic capacity by light movement stimuli, the only capacity in which the eye's purely visual connection with symptoms associated with sea-sickness can be considered. The same is true of pseudo-optic nystagmus when the eyes follow a ping-pong game, the ocular movement is also intrinsic, but is now determined by interest.

If, however, nystagmus occurs in conjunction with any other equilibratory complication, disorientation cannot but be aggravated. When train and car sickness threaten the susceptible passenger he is unlikely,



therefore, to continue watching the passing landscape and so increase the dilemma provoked by vestibular impulses. Imposed movements from without, as in tram and car travel, which are characterized by positive and negative acceleration in angular movement, as in the rounding of curves, excite the vestibule to send impulses which pass to the eye, neck and trunk. The eye has then the double task of reconciling the extrinsic with the intrinsic information. It will be realized that with closure of the eyes the extra-ocular muscular movement does not, therefore, cease, but still contributes through the associated proprioceptor impulse an element to dilemma.

To bandage one eye, to keep both closed, or to paralyse accommodation with homatropine, is sometimes advised. We may assume that this advice is based on the belief that the passenger will then cease to bother with the effort to secure visual objective alignment. This will, however, have no appreciable effect on the extra-ocular responses from the vestibule and can have no possible effect on the responses of the neck, body and limbs. A possible disadvantage in certain cases from elimination of the visual field may, indeed, arise from the passenger's attention being directed to his subjective sensations.

The dysfunction of the vestibule, in its inability to register accurately a certain phase associated with a certain type of imposed movement, results in a discharge of impulses into motor channels which cause false subjective orientation. These impulses proceed from the vestibule by the posterior longitudinal bundle through the ocular nuclei to the extra-ocular muscles and exhibit the vestibular dysfunction by a constant tendency to deviation, which is registered consciously by proprioceptor impulses. Other impulses from the vestibule proceed by the vestibulo-spinal tract to the neck, body and limbs, causing involuntary postural deviation with a tendency to fall and involun-

tary kinetic deviation with a tendency to past point. They are all reactions of disservice where in their absence the body would have maintained stable equilibrium.

To the vestibule, therefore, the solution of the eye's small contribution to disorientation is referred, and that is why treatment dealing with the eye, as the organ of vision merely, under the conditions of sea and air travel, has little to recommend it. In view of this, it may, at this stage, be difficult to understand why the somewhat perplexing advice "to fix the eye on the far horizon" has so much in its favour. Only a closer consideration of vestibular function will make this clear.

*The vestibule.*—The vestibule is, in fact, "the nigger in the woodpile" It can influence all other factors of equilibration, but is itself uninfluenced by them; the way from it is a one-way route, there being no afferent nervous channel. Unlike the eye, or the end-organ of hearing, it is not an exteroceptor; it is said to have no cortical representation, but makes its behaviour, orderly or disorderly, perceptible only through the proprioceptor reactions it induces in the other factors in equilibration.

Whatever place the static organs of the saccule and particularly the utricle may have in disorientation, such as that experienced in a swiftly-descending lift, it is generally agreed that the semicircular canals are the chief means by which most of the externally imposed movements cause the seasick syndrome. The physical limitations of the endolymph restrict the scope of useful reflexes to angular movements of short duration only. If the movement is sufficiently rapid, and continues beyond a certain time, the endolymph betrays the defect of its inertia by continuing to move after the imposed movement has ceased. The excitation of the ampullæ and the passage of impulses continues so long as the lymphokinesis persists. The proceeding impulses to the eye, neck and body cause

primary reactions to compensate the illusion of continued movement and, in consequence, disorganize the function of equilibration.

The severity of the reaction depends on the plane in which lymphokinesis takes place. If in a plane at right angles to the long axis of the body (horizontal lymphokinesis) the reactions are usually tolerable, as in waltzing and merry-go-rounds. If the movement passes through the plane of the long axis of the body the experience is decidedly unpleasant. There is the illusion of tumbling head over heels. The rarity of this experience, and therefore of the opportunity to learn its correct compensation, leads to disagreeable conflict.

Bárány, by means of the rotating chair, was able, by fixing the head of the subject in certain positions, to excite post-rotatory lymphokinesis in any plane, and was thus able to correlate the primary reactions with the particular plane. Caloric douching confirms the findings of the rotation tests in these respects and also with regard to the secondary reactions, in that these are far more likely to occur after vertical lymphokinesis than after horizontal. The knowledge of the effect on the plane of lymphokinesis enables the subject to increase or mitigate the severity of the reaction at will by a change of head posture.

The experimental change of posture is linked up with the positions learned on board ship by practical experience, which illustrate the same principle. The resemblance between the rotation tests and movement at sea is shown further in the ability to excite the secondary symptom without too severe a primary reaction. That is done by a succession of short-period rotations when the nystagmus may almost escape notice, the deviation of past pointing appears negligible, and the tendency to fall is still controllable. If this is, however, continued for half an hour or more, sickness supervenes. This means that the onset of sea-sickness in the ordinary person, uncomplicated by

personal peculiarities, such as an apprehensive temperament, a ready suggestibility, or a body suffering from excessive indulgence, is a late sequel to a summation of recurring dilemmas

*The secondary reactions.*—These represent a conflict between the muscular proprioceptor impulses from the primary reactions on the one hand, and the joint, pressure, skin and visual impulses unaffected by the vestibule on the other. The significance of the difference in sign reactions has only lately been fully recognized with regard to their bearing on treatment. The sympathicotomies show a rise of blood-pressure and of pulse-rate and an early tendency to vomit, while the vagotomies show a fall of blood-pressure and of pulse-rate and an early tendency to faint. The symptom reactions are very variable, but the more usual are headache, lassitude, blurred vision or a wavering visual uncertainty, "sinking in the stomach," nausea and vomiting.

#### TREATMENT

As lymphokinesis is the primary source of disorder ending in sea-sickness it follows that there is no direct means of inhibiting its post-rotatory movement. It is outside all nervous control, and while it reveals its dysfunction by pouring impulses into the eyes, neck, body and limbs, there is no reciprocity, no means by which these in turn can affect the movement of endolymph.

Our knowledge of experimental rotation explains why it is that, if the externally imposed movement of the boat cannot be stopped, it can in certain cases be modified by a change of head posture. In the more simple example of swinging or riding in a swiftly-moving lift, nothing so wards off the feeling of "sinking in the stomach" as by depressing the head, thus diminishing the pressure, positive or negative, of the otolith on the macula of the utricle. The advice to seasick passengers follows the same principle when

they are recommended to take up certain positions in reference to the prevailing type of motion, roll or pitch, which, however, clearly meets with only moderate though quite noticeable success, since no one position can possibly cover all planes of semicircular canal excitation.

The soundest advice to all susceptible passengers is to take part in deck games, dancing and drill. It will require some persuasion to rouse them to do so because they so soon become victims to lassitude. When possible this measure has everything to recommend it. It cuts down the transitional period in the acquirement of immunity, and it is, in fact, an anticipation of what takes place more slowly, more painfully, but unconsciously, when the patient is left to himself. These exercises, then, have not only a general hygienic value, but, if carried out determinedly, modify directly the primary and, indirectly, the secondary reactions. The underlying object is to counteract the action of the vestibule on the eye, neck, trunk and limbs by the engagement in voluntary action of all these parts of the body, in some specific task, to monopolize, as far as possible, channels engaged in the passage to the soma of these disorderly impulses from the vestibule. Voluntary fixation of the eye, correction of the tendency to fall, and of the tendency to past point, to counteract, in fact, primary reactions of disorder, is the desired objective.

Malan<sup>4</sup> mentions the celerity with which the Italian airmen gain control of post-rotatory nystagmus. Experiments repeated on civilians support his observations. His attention, however, has not been drawn to a like ability in controlling the error of past-pointing and the tendency to fall. When the subject to these tendencies appreciates the error and makes allowances for them by the necessary motor modifications, he will, according to the extent of his success, monopolize the final common path to the exclusion of the vestibular

disorientating impulses. In sea-sickness these primary reactions do not occupy much attention, because the mind is taken up with the more unpleasant secondary reactions, the seasick symptoms, nausea, vomiting, and so on. The important and not clearly appreciated fact is the effect that this inhibition has on the course of the secondary reactions, which are merely the result induced by irradiation of a central conflict of impulses. In short, the abatement of true sea-sickness depends upon side-tracking the primary reactions.

For the bad cases the chief recourse apart from general hygienic measures is to rely on drugs. It is imperative, however, that if drugs are resorted to, the physician shall appraise the type. Irradiation has peculiar ways of behaving, but as a rule reveals itself according to type, in one or two ways, either predominantly sympathetic or predominantly vagal. Of the two the vagal type, owing to its tendency to collapse, gives the ship's surgeon the greater anxiety. It sometimes occurs in subjects who, at first, suffered apprehension, which has not been allayed, and means an exhaustion of the sympathetic. Prophylaxis was obviously indicated in the first place to deal with the apprehension. More frequently, however, the vagal type appears without warning of any kind, and is as much a clearly defined variation in man as it is in the rabbit and dog,<sup>5</sup> which always responds to vestibular excitation by a fall of blood-pressure, and, in contrast to the cat,<sup>6</sup> which responds by a rise of blood-pressure. The vagal type is exceedingly sensitive to imposed movement. It is not, as a rule, amenable to suggestion, but does respond definitely to pressors and stimulants. Indiscriminate prescribing of secret remedies must therefore reflect on professional vigilance.

Only the broad principles of drug treatment can be touched on here. With the almost insuperable difficulty in securing controls, direction regarding the merits of particular drugs must appear dogmatic. The choice

of sedatives among the chloretone, the chloralamide, barbitone and bromide groups is wide, and the choice should not be difficult. The choice of drugs for the treatment of vagotonia is wider and calls for still greater acumen and experience. The implication in the advertised proprietary drugs is that sea-sickness is a sort of entity, as if there was no such thing as type. The administration of the proprietary drugs, without a clear understanding of their ingredients, is inexcusable and reflects on professional skill.

The loss of reputation sustained by the latest German device, that of oxygen inhalation, with vaporized ephedrine and adrenaline was not undeserved, inasmuch as it was administered without the slightest regard for indication; it was, in fact, urged in its favour that the deck stewards themselves could handle it. Its frequent failure was, in fact, to be expected, applied, as it must have been, as often to the apprehensive type as to the vagal type, its proper and only indication.

It is perhaps too much to ask the susceptible passenger to undergo some rigid training to counteract vestibular disorder by daily increasing exercises of rotation. When, however, in the cases of those who, compelled to travel, cannot acquire immunity because they are always prostrate, then it is urged that they do undertake these exercises along with their daily dozen, and, if possible, in an ordinary revolving chair following the directions of head posture given below. In the absence of a chair, then by an exercise, popular with children, of walking quickly round a walking-stick held in the centre of the excursion, with the head bent forwards or backwards or on either side, beginning with two revolutions and increasing them from ten to twenty revolutions. The object is to present the head in as many planes as possible to cover all planes of excitation, such as occur in the various movements at sea. Immediately after each series of rotations the head should be brought to the vertical and the attention

wholly occupied in correcting the ensuing errors of post-rotatory deviation.

First, the eyes should be fixed on some near and previously indicated object, secondly, the tendency to past-point after each series of rotation should be learned and then corrected. Thirdly, the direction of the tendency to fall (body deviation) after each series of rotations, should be appreciated and corrected. The last exercise offers considerable resistance, since the corrected movement is opposed to the illusory position of safety, which the deviation tendency is intended to correct. Between each series of rotations there should be a 5- to 10-second interval to allow of these corrections. If the subject eventually succeeds in overcoming the deviation errors in these primary reactions of vestibular dysfunction, he will have succeeded also in raising a barrier to the secondary reactions, the real objective of these rather tedious exercises. Lastly, every possible opportunity of swinging or riding in lifts should be used.

It is not possible to know beforehand what the specific reaction to movement at sea may be in the case of the apprehensive subject, since a sedative prophylaxis may cut out the early tendency to vomit to the signaling action of boat movement, and may disclose the fact that he has but average susceptibility. The above exercises, in circumstances which do not excite apprehension, will thus determine his true susceptibility, and, in any case, will aid in reducing his excitability to the signalizer.

Sedative prophylaxis, when correctly administered to apprehensive subjects, not only allays anxiety but may actually increase appetite. The appetite will not be without effect on ketosis, since at the same time the sympathetic arrest of alimentary function is modified. There is good reason, therefore, for believing a subsequent need for alkalis and glucose will not arise during the voyage, except to deal with post-vomiting ketosis.

In conclusion, advertised remedies, from the more



innocent kind, such as abdominal belts, mercury pendants, to the more considered treatment by glucose and alkalis, by the mastoid anodes, by the last and most modern device of oxygen and vaso-constrictor inhalation, all, even the crudest, have had an astonishing vogue, like all new remedies, time and more careful experiment disposing of most. A great many of these remedies have been given extended trial without prejudice, but there were few of them whose pretensions were, if not absurd, extravagant. The results, as was to be expected, when given indiscriminately, were disappointing. Out of the limbo of these methods and drugs, however, a tempered opinion remains of the value of a great many, but all of them makes imperative a study of the individual case.

If the nature of sea-sickness, its connection with the disorders of equilibrium, and the acquirement of immunity, is clearly comprehended by the ship's surgeon he will realize the extent of his powers and of his limitations. If he goes to the trouble of examining his patients with the object as far as possible of classifying them according to type, whether sympathetic, vagal, suggestible or self-indulgent, he may be expected to render them a very real service. The details of treatment in the choice of drugs, the correct posture to be adopted, or the kind of games and exercises to be pursued, and the dietary, can then be safely left in his hands.

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# The Subcutaneous Tuberculin Test

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IN this series of 106 cases the diagnostic value of the subcutaneous tuberculin test has been compared with radiographic evidence in diseases of the lung. The cases were those of suspected pulmonary tuberculosis without any tubercle bacilli found in the sputum.

The subcutaneous tuberculin test is the subcutaneous injection of increasing amounts of old tuberculin, at intervals of from four to seven days. In adults, with slight symptoms and signs, I inject the following amounts:—0·0001 c.cm., 0·001 c.cm., 0·005 c.cm., and 0·01 c.cm. For children under fifteen, with slight signs and symptoms, the first dose is 0·00001 c.cm., and for children and adults with signs of active disease in the lungs the initial dose is one hundred millionth of a c.cm. Here the dose is apparently infinitesimal, but in a girl of eight with tuberculous glands in the neck I have seen a rise of temperature of 4° F. after an injection of one millionth c.cm.

The tuberculin test has a double value. A tuberculous individual reacts to an amount which has no effect upon a healthy person. Koch regarded 0·025 c.cm. as the amount which usually produced symptoms in healthy adults. Therefore the value of a reaction as indicative of tuberculosis is in inverse proportion to the amount injected. A reaction to a small amount is of greater diagnostic value than a reaction to a larger amount. Conversely, the absence of a reaction to a large amount of tuberculin is of

concerning the diagnostic value of tuberculin and of radiographic signs suggest *a priori* an extraordinary degree of correlation between the two tests. Such a correlation would be too good to be true, or too true to be good. In casting about for a method of presenting these cases I sought to determine to what extent there was any correlation between the five groups of signs in the two tests. The results, together with the ultimate diagnosis, are set out in the following diagram.

Reactions.		RADIOGRAPHIC SIGNS									
		1		2		3		4		5	
		T	O	T	O	T	O	T	O	T	O
0 0001 c cm.	T	1		4		5		2		1	
	O										
0 001 c cm.	T	9		7		17		4		2	
	O										
0 005 c cm.	T	8		4		11		3		1	
	O						1		1		1
0·01 c cm.	T	.....				2					
	O						4		4		2
No Reactions	T	1		1							
	O				1	8			1		

T = Tuberculosis

O = Other Diseases.

(A) *Correlated Group*.—In the upper left segment of the plan, within the dotted line, are 67 cases. In these cases there was correlation, as the radiographic signs of apical nodules, mottling, or of increased apical striation were associated with a febrile reaction to 0·0001 c.cm., 0·001 c.cm., or 0·005 c.cm. of tuberculin. Of these cases all except one were diagnosed as pulmonary tuberculosis.

(B) *Uncorrelated Group*.—In the lower left segment of the plan are 17 cases where X-ray indications of pulmonary tuberculosis were not endorsed by the results of the tuberculin test. Of these 17 cases only

4 were diagnosed as pulmonary tuberculosis.

(C) *Tuberculin Group*.—In the right hand segment are 22 cases where X-ray signs were not indicative of tubercle, and in that group 14 cases were diagnosed as pulmonary tuberculosis. Here diagnosis mainly depended on the tuberculin test, and thus I have called the Tuberculin Group.

*(A) Tuberculin Reactions in the Correlated Group*

Cases	0 0001 c cm	0 001 c cm.	0 005 c cm	0 01 c cm
(a) Radiograms show Apical Nodules				
1	+	+		
2-3	—	+		
4-10	—	+		
11-16	—	—	+	
17-18	—	—	+	
(b) Radiograms show Mottling				
19	+	+	+	
20	+			
21	+	+	+	
22	+	+	+	+
23-27	—	+		
28-29	—	+		
30-32	—	—	+	
33	—	—	+	
(c) Radiograms show Apical Striation +.				
34-35	+	+		
36	+			
37	+	+	+	
38	+	+	+	+
39-51	—	+		
52-55	—	+		
56-66	—	—	+	
67	—	+	+	

Of the 67 cases 66 were diagnosed as pulmonary tuberculosis, and on Philips' classification were grouped as follows :—

$L_1$	$L_{1s}$	$L_{1S}$	$L_{2s}$	$L_{2S}$	$L_{3s}$
5	38	1	6	1	15

In 14 of these cases no obvious physical signs were detected in

the chest suggesting pulmonary tuberculosis

In *Case 12* the sputum had been inoculated into four guinea-pigs, of which one developed tubercle

*Case 17* gave a weak reaction to 0.005 c cm. tuberculin, but a focal reaction appeared in one of the cervical glands, which became enlarged and tender. The reaction passed off within a week

In *Case 18* tubercle bacilli were found in the sputum later on after repeated examinations

*Case 40* gave a strong febrile reaction to 0.001 c cm tuberculin, and also showed a focal reaction at the right apex, where crepitations appeared and remained for a few days

### *Diagnosed as Non-Tuberculous*

*Case 67* was diagnosed as debility from pyorrhœa, air entry was weak all over the chest, with slight dullness at the right apex. Radiogram showed slightly increased striation in right upper lobe. There was a weak reaction to 0.001 c cm tuberculin, but none to a second injection of the same amount. After 0.005 c cm the temperature rose to 99° F. Complement fixation test for tubercle was negative, as also was the Wassermann reaction

### *(B) Tuberculin Reactions in the Uncorrelated Group*

Cases	0.0001 c cm	0.001 c cm	0.005 c cm	0.01 c cm
(a) Radiogram shows Apical Nodules				
68	—	—	—	—
(b) Radiogram shows Mottling				
69	—	—	—	—
70	—	—	—	—
(c) Radiogram shows Increased Apical Striation				
71-72	—	—	—	++
73-76	—	—	—	++
77	+	—	—	—
78	—	—	—	—
79-84	—	—	—	—

In this group radiographic evidence in favour of tubercle was opposed to the results of the tuberculin test. Of the 17 cases 4 were diagnosed as tuberculous. It is therefore necessary to indicate not only why

four cases, despite the tuberculin reaction, were diagnosed as tubercle of the lung, but also why 13 cases, despite the X-ray evidence, were diagnosed as non-tuberculous.

The first three cases are of particular interest because they are the only cases in the series where apical nodules or mottling—the strongest X-ray suggestions of tubercle except excavation—were not endorsed by the tuberculin test. Of these three cases (68-70) two were diagnosed as tuberculous and one as non-tuberculous.

#### APICAL NODULES AND/OR MOTTLING

##### *Diagnosed as Pulmonary Tuberculosis*

*Case 68*—Healed tuberculosis  $L_1$ . A history of pleurisy 5 years previously. No abnormal physical signs in chest. Radiogram showed "Striations up to both apices, and some (?) nodules showing there."

*Case 69*— $L_1$ . Only three injections of tuberculin. Tubercle bacilli reported in sputum 2½ years previously. Moderate dullness left apex. Radiogram "Much mottling left upper lobe." Eighteen months later a traumatic pneumothorax, and within three years death.

##### *Mottling Diagnosed as Non-Tuberculous*

*Case 70*—Bronchial asthma. Radiogram showed "Striation and mottling over left lung." Physical signs in chest of asthma, which had appeared after "gassing" in the Great War.

#### RADIOGRAM SHOWS INCREASED APICAL STRIATION

In the other 13 cases in this group the X-ray suggestion of tuberculosis did not exceed increased apical striation. Of these cases two were diagnosed as healed tuberculosis— $L_1$ .

##### *Apical Striation Diagnosed as Tuberculosis*

*Case 71*— $L_1$ . Clinically, slight dullness right apex, and definite dullness left apex. Radiogram "Striations towards both apices, but no definite nodules."

*Case 72*—The radiogram showed "Increased striation at both upper lobes, especially at the left upper lobe." Clinically, there was slight dullness at the right apex. Tubercle bacilli in the sputum had been reported seven months previously.

##### *Apical Striation Diagnosed as Non-Tuberculous*

*Case 73*—Post-pneumonic fibrosis. Clinically, slight dullness over right lower lobe. Radiogram "Very suspicious towards right apex." Tubercle complement fixation test—negative.

*Case 74*—Physical signs of chronic bronchitis. Radiogram "Striations towards both apices. Looks like T B." Complement-

fixation test for tubercle—negative, and Wassermann reaction negative

*Case 75*—Old gunshot wound of lung Radiogram showed "Striation towards both apices (?) small nodule right apex"

*Case 76*—Physical signs of emphysema in a man aged 53 Radiogram "Rather marked striations, but no evidence of any nodules"

*Case 77*—Chronic malaria No abnormal physical signs in chest Radiogram "Fairly well marked striations but no definite nodules showing at apices" Gave a weak reaction (99 6° F) to 0 0001 c cm tuberculin, but none to following injections

*Case 78*—Physical signs of chronic bronchitis Radiogram "Marked peribronchial thickening Very marked striation throughout both lungs, especially towards right base Looks more like a chronic bronchitis" Only three injections of tuberculin—no reaction

*Case 79*—Non-tuberculous fibrosis Slight dullness at right apex Radiogram "Slightly suspicious at right apex"

*Case 80*—Physical signs of chronic bronchitis Radiogram "Marked striation towards both apices, but no nodules"

*Case 81*—Physical signs of chronic bronchitis Radiogram "Increased fibrosis in both lungs"

*Case 82*—Neurasthenia No abnormal clinical signs in chest Radiogram "Enlarged glands right root Fine fibrosis left upper lobe below clavicle"

*Case 83*—Dyspepsia Slight dullness right apex, moderate at left Radiogram "Increased fibrosis in left upper lobe"

*Case 84*—Gastritis No clinical signs in chest Radiogram "Marked striations throughout lungs Left apex looks rather suspicious"

### (C) *Tuberculin Reactions in the Tuberculin Group*

Cases	0 0001 c cm	0 001 c cm	0 005 c cm	0 01 c cm
	(d) Radiogram shows Increased Root Shadows and/or Peribronchial Thickening			
85-86	+ +			
87-89	—	+ +		
90	—	+		
91-93	—	—	+ +	
94	—	—	+ +	
95-98	—	—	—	+ +
99	—	—	—	—

In this group the X-rays signs did not suggest pulmonary tuberculosis; and here, in comparing the two tests it should be noted that whereas an absence of X-ray evidence does not necessarily exclude pulmonary tuberculosis, an absence of febrile reaction to

an adequate dose of tuberculin should exclude active tuberculosis. Moreover, an area of caseation in the lung must reach a size of 4 c mm. before it throws a corresponding shadow, whereas long before any shadow is thrown a small dose of tuberculin may induce a positive reaction. Of the above fifteen cases, the first nine (85-93) were diagnosed as pulmonary tuberculosis, classified as follows:—

**ROOT SHADOWS +, AND/OR PERIBRONCHIAL THICKENING**

*Diagnosed as Tuberculous*

L <sub>1</sub>	L <sub>1</sub> s	L <sub>1</sub> s
1	7	1

In these nine cases physical signs in the chest suggested a diagnosis of pulmonary tuberculosis.

*Diagnosed as Non-Tuberculous*

*Case 94* —Post-influenzal fibrosis No physical signs of tubercle  
Radiogram "Increased fibrosis at right lower" Complement fixation test for tubercle negative, and Wassermann test negative

*Case 95* —Post-pneumonic fibrosis Dullness most marked left lower lobe Radiogram "Increased fibrosis in both lower lobes"

*Case 96* —Old empyema scar over left lower ribs at back Radiogram "Marked fibrosis in left lung"

*Case 97* —Emphysema Chest barrel-shaped Radiogram "Marked peribronchial thickening, especially in left lung"

*Case 98* —Effects of gas in Great War Slight dullness right apex Radiogram "Well-marked peribronchial thickening, but both apices seen fairly clear. Apparently no evidence of TB"

*Case 99* —Neurasthenia No abnormal physical signs in chest Radiogram "Peribronchial thickening, but no mottling in upper lobes"

In the remaining cases, where the radiograms were either indefinite or showed nothing abnormal, the reactions to tuberculin were as follows:—

Cases	0 0001 c cm	0 001 c cm	0 005 c cm.	0 01 c cm
	(e) Radiogram Indefinite or Normal.			
100	+ +			
101-102	—	+ +		
103	—	—	+ +	
104	—	—	+ +	
105-106	—	—	—	+



## CASES WITH NO RADIOGRAPHIC SIGNS

*Diagnosed as Tuberculous*

The first four cases were diagnosed as pulmonary tuberculosis as follows:—

L<sub>1</sub>s.

2

L<sub>3</sub>s

2

In these four cases the physical signs in the chest also suggested pulmonary tuberculosis.

*Diagnosed as Non-Tuberculous*

Case 104 gave a strong reaction to 0 005 c cm tuberculin. There were no abnormal physical signs in the chest, and, as the radiogram showed nothing abnormal, a diagnosis of pulmonary tuberculosis was impossible. A tuberculous focus may have been present, but if so it was not detected, and the case was diagnosed as Neurasthenia.

Case 105 was emphysema.

Case 106 was a case of neurasthenia, with slight dullness at the right apex.

## SUMMARY

When tubercle bacilli are not found in the sputum an infallible diagnosis of pulmonary tuberculosis cannot be made either by the tuberculin test or by radiograms alone. In many cases the ultimate diagnosis, whether right or wrong, must be made by these tests in conjunction with history, symptoms, and physical signs in the chest. Where no abnormal physical signs can be detected diagnosis in the main depends on tuberculin in conjunction with radioscopy and radiograms. Assuming the final diagnosis to have been accurate then the two tests work out as follows.—

*Radiograms*

- (1) Of 19 cases showing apical nodules, 19 were tuberculous
- (2) Of 17 cases showing mottling, 16 were tuberculous
- (3) Of 48 cases showing apical striation, 35 were tuberculous
- (4) Of 15 cases showing peribronchial thickening, 9 were tuberculous
- (5) Of 7 cases showing no X-ray signs, 4 were tuberculous

*Tuberculin Reactions*

- (1) Of 13 cases reacting to 0 0001 c cm, 13 were tuberculous

- (2) Of 39 cases reacting to 0 001 c cm , 39 were tuberculous
- (3) Of 30 cases reacting to 0 005 c cm , 27 were tuberculous
- (4) Of 12 cases reacting to 0 01 c cm , 2 were tuberculous
- (5) Of 12 cases giving no reaction, 2 were tuberculous

### *Comparison*

Of 82 cases with tuberculin reactions indicative of tubercle, 79 were tuberculous (96 per cent )

Of 84 cases with X-ray signs indicative of tubercle, 70 were tuberculous (83 per cent )

Of 24 cases without tuberculin reactions indicative of tubercle, 4 were tuberculous (16 per cent )

Of 22 cases without X ray signs indicative of tubercle, 13 were tuberculous (59 per cent )

### CONCLUSIONS

The subcutaneous tuberculin test is often indispensable in diagnosing diseases of the lung. The tuberculin test may give the correct interpretation of radiographic evidence. X-ray evidence may give the correct interpretation of the tuberculin test, especially in cases reacting to 0 005 c cm.

### Reference

- <sup>1</sup> Sutherland, Halliday " Pulmonary Tuberculosis in General Practice " Cassell & Co , London, 1916

# Temperaments and Senses

By E. A. BARTON, M.R.C.S., L.R.C.P.

A VERY close study of the sick during nearly half a century leaves the impression that certain diseases are often associated with a definite and characteristic mental attitude; and that this attitude is not merely a coincidence is proved by the frequency of this association. We are so ignorant about what constitutes temperament, how it can be changed and altered by environment or disease, and how a normal personality can become abnormal as the result of the invasion of some bacterial poison, or modified by the excess or deficiency of some essential hormone. It is easy to account for a definite temperament in a growing child suffering from some congenital misfortune which limits its capacity to respond completely to its environment, and thus tends to warp the mental outlook in consonance with its surroundings; but in the adult the connection between disease and temperament is so elusive, and bears, so far as I know, so little scientific basis of explanation that it may be worth while to record for what they are worth the vague and tenuous hints borne in on one who has taken a special interest in the matter.

To begin with an obvious case. Who has not been struck by the singularly pleasant outlook of many patients with slight tuberculous infection. How artistic is the mental attitude, what a charming companion he makes. His mind runs to beautiful things; he is often an artist, poet or musician, but is always a dreamer of charming dreams. Something of a nuisance perhaps in his political views, with his glorious altruism, his desire is that all should have the best of everything, at the same time quite regardless of the means of such attainment. And when he gets an exacerbation of his disease note his splendid optimism, his plans for life,

"As soon as I am well again"—for he is always on the edge of recovery. And this optimism in many cases continues to actual death. A young man dying of advanced tuberculosis, who was an accomplished skater, said to me: "If the frost holds good I will be with you on the lake on Sunday." This was on a Tuesday; on Saturday he was dead. Such optimistic cases are not the invariable rule in tuberculosis, but there are far too many such for the condition to be a mere coincidence, and therefore one is correspondingly impressed with the feeling that the toxins of the tubercle bacillus must in some way be responsible for this illogical optimism. The tuberculous in the early or even quiescent stage are alleged to be rather more sexually capable than normal. There may be something in this, and from cases observed I am inclined to think that this may be so.

Now for the reverse picture: the mental state is profoundly altered and depressed in all streptococcal infections, and this without any reference to pain. The suicide statistics rose considerably during some of the influenza epidemics associated with streptococcal complications, as most of them were, and I have most vivid memories of whole families convalescing after influenza during the serious epidemic in 1890 weeping together over the fire because they were so miserable. Even in the case of a small localized centre of infection, such as a whitlow or a boil, I have seen a well-marked melancholic state which entirely disappeared within half an hour of the relief of tension; indeed, in my own experience of a small infection, I was aware of a mental depression of a deep and very real character impossible to overcome by any logic, and quite out of proportion to the slight pain.

With regard to malignant disease the associated melancholy cannot be dissociated from the concomitant suffering, and the all but certainty of death as the only relief, so that any observation is valueless. Perhaps

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To begin with an obvious case. Who has not been struck by the singularly pleasant outlook of many patients with slight tuberculous infection. How artistic is the mental attitude, what a charming companion he makes. His mind runs to beautiful things; he is often an artist, poet or musician, but is always a dreamer of charming dreams. Something of a nuisance perhaps in his political views, with his glorious altruism, his desire is that all should have the best of everything, at the same time quite regardless of the means of such attainment. And when he gets an exacerbation of his disease note his splendid optimism, his plans for life,

be most impressive. The delightful man becomes brutal, the clean-minded man dirty, and the calm personality violent.

Another curious alteration in personality and character due, I feel sure, to some change in internal secretion, is observable in many men approaching advanced years, noticeable not necessarily in those of low intellect, but frequently in those of unusually high mental attainments whose life-work is proof of their profound knowledge. Their sense of humour is altered; they relate pointless stories of the dirtiest nature with the utmost relish, just like an evil-minded schoolboy, and appear to obtain the greatest amusement. This condition must in some measure be due to failure or excess of an internal secretion, and in the cases of this kind examination has shown definite enlargement of the prostate. In these men keen desire persists long after capacity is dead, and I am sure that in this fact lies the solution of many of the unpleasant police cases in which some of the present-day papers wallow. Such humour smacks of the primitive races, among which, apart from horseplay, the lumbar pleasantries are the only form which appeal to them.

Now to consider the influence on temperament consequent on physical shortcomings of a congenital nature. The failure of complete reaction to surroundings, which must of necessity exist in any limit to the full use of our senses generally, takes a course corresponding to the deficiency in the sense involved and also to the extent of such limitation. An extreme example is a child with deaf-mutism—mute because deaf, in whom the senses of sight and touch take over as far as possible the grave handicap of want of hearing. The difficulty of getting through to the "soul" of the child exercises all the ingenuity of the parents. Such a child plays alone in a small world of which he is the centre, the other inhabitants existing to tender to his wants and supply his needs. It is most difficult to

correct such a child, for the distinction between right and wrong is a matter impossible to explain to him. And yet the child is no more unhappy than any of us who are in full possession of five senses only, out of the multitude of those lost through atrophy for want of use during the upward stages of our evolution. Soon we shall have but four, as the fast-diminishing sense of smell becomes less and less since man rose from four legs to two, and has used sight rather than his nose for hunting and for the selection of his mate. Hence the development of sight in man to a far higher degree than that of most animals, the deer and the mountain sheep being well-marked exceptions. We do not miss a sense which we have never enjoyed any more than we miss the use of the pineal eye. Such senses, of which we have no cognizance and we ignorantly dub instincts for want of a better term, we see and marvel at in the lower animals, birds, and fish; they are, however, definite senses, probably with sense organs and possibly with centres of response somewhere in their nervous system. What has become of our mass-control sense, so obvious, for instance, in the crowded evolution of starlings in autumn, where, when closely packed, each bird has but a cubic foot of space in which to fly, and in which narrow confine the penalty of failure to keep accurate station is collision and death. No bird leader could possibly be seen by all at once, and the transmission of control can only be received by some highly-developed sense of which we have no conception. Yet they move instantaneously and synchronously or they would collide. Take, again, the orientation sense of cats and birds, the antennæ sense of the oak-egger moth, and numberless other instances which occur to the mind of any close observer of Nature. We do not miss these senses, never having enjoyed them. What they are we do not know, any more than does the deaf-mute miss the senses of which he is deprived, or we ourselves miss the opulence of

the fourth dimension

The limitation to perfect vision has another definite complex according to the degree and character of the deficiency. A child with uncorrected hypermetropia is looked on as stupid at school and starts life handicapped with an inferiority complex in consequence. It is only when the headaches are prominent and complaint is made, or when there exists a definite strabismus, that interest is taken and correction made. Then it is that the failure often turns out an average or even superior intellect. Very different, however, is the state of the congenital myope. In the myopic state the visual acuity is bounded by a few feet, the retinal image of objects in this area being larger than that in the normal eye. Printed type therefore is larger to him than to those of normal vision, and as a result he learns only from the printed word, which becomes the absolute law of his life. Seeing nothing sharply beyond his limited horizon he learns little by observation, nothing by experience, and his main source of learning is print. So that this child is often from the examination point of view clever—he passes his school life at the top of his form. He has not any interest in athletic games for he cannot see, but in reading, mental problems, such as chess, cards and puzzles, he finds relaxation—all within a few feet of his eyes. What is the result? He grows up saturated in precedents culled from books which are the principal contacts he has with the outside world. His assurance in the certainty of truth in the written word is often pathetic, leading sometimes to an argumentative and negative complex in proportion to his inexperience of physical facts. I recall the occupation of the various witnesses in the Vaccination Commission and noted how often the "Anti's" were cobblers or tailors or men whose business was of a close-viewed and sedentary nature, obviously myopes physically and mentally. If, however, the myopia is corrected early in life the



# Some German Spas

By R. SCOTT STEVENSON, M.D., F.R.C.S.E.

GERMANY is a country of spas—they number more than 1,200, of one kind or another, although most are merely a hotel with a mineral spring attached. Just as the English paterfamilias has been accustomed for a generation or two now to regard a holiday as meaning a visit to the seaside, so has his German contemporary looked upon his annual “cure” at a spa as his holiday. Recent years have seen great developments at the British spas, and the present propaganda to send British patients to British spas has more than patriotism to commend it. Although in the treatment of rheumatism the English spas are second to none in the world, as they ought to be in the treatment of that devastatingly English disease, nevertheless there are certain German spas that will repay the attention of British medical practitioners and British patients, not only because of the qualities of the waters with which Nature has endowed them, but also because the physicians at these spas have specialized in the treatment of certain diseases which are not commonly treated at British spas.

When it was suggested recently that I should pay a visit to some German spas I accepted on condition that I visited spas whose waters contained natural carbon dioxide (which is not found naturally in any English waters) and which made a specialty of diseases other than rheumatism. I was invited, therefore, to visit a group of spas complying with these conditions, namely, Neuenahr, Homburg, Nauheim and Kissingen, the furthest of which is only 18 hours from London by rail and boat. At all of them English people are cordially welcomed, and everyone I met understood English.

## BAD NEUENAHN

Neuenahr is a charming little town in the romantic

valley of the Ahr, a tributary of the Rhine, not far from Bonn. The town is only a mile from the springs where the well-known mineral water Apollinaris is bottled, the holding company of which is still, I believe, an English concern. Neuenahr has five mineral springs, of which the chief constituents are a small amount of sodium bicarbonate and free carbon dioxide. This spa has long had a reputation for the treatment of diabetes, and since the discovery of insulin, the physicians there have kept themselves up to date and are in touch with all the latest developments of dietetic and insulin treatment. In addition, however, Neuenahr specializes in the treatment of gastro-intestinal disorders, and particularly in diseases of the gall-bladder; some of the radiograms of the gall-bladder and of duodenal ulcer which I was shown here were among the very best I have ever seen. There are 136 bathrooms at the thermal bathing house, on the level, and most of the modern methods of spa treatment have been installed.

The best season at Neuenahr is May, June and September—in July and August it is rather crowded; but there are many amusements, four concerts daily by the Kur orchestra, theatre once or twice a week, cinema, and particularly good tennis courts, where an international tournament is held each year. At the Kur Sanatorium 15 marks a day (the exchange is 15 marks to £1 at present) covers board, special diet and medical attendance, baths cost 2 to 3 marks each, so that the expenses of a stay here should not be more than 18 marks (say £1:6·0) a day. At the best hotel the inclusive charge was 10 marks a day, but, of course, that did not include medical attendance.

#### BAD HOMBURG

Homburg is inclined to live on its past glories, and every one I met there spoke, with a tear in the eye, of King Edward VII and the great days when he

stayed at Rutter's Parkhotel every year and even his hat was called after the town. Of course, long before King Edward's day Homburg was a fashionable spa, notorious for its gambling, which was presided over by the brothers Blanc, one of whom afterwards went, in the 'seventies, to Monte Carlo and founded the casino there. Homburg's chief disadvantage to-day, however, is that it is almost too near Frankfurt, and the citizens of that famous financial centre find it an

### DIET-MENU OF BAD HOMBURG, ORDERED BY THE MEDICAL SOCIETY

WHAT IS WRITTEN ON THE CARD, EACH GUEST CAN PUT TOGETHER THE DIET WHICH HAS BEEN ORDERED BY THE DOCTOR.

	Price		Price
Coffee Hag - - - - -		5 Potatoes, etc	
Malt coffee - - - - -		(a) Mashed potatoes - - - - -	
Cocoa - - - - -		(b) Boiled potatoes - - - - -	
Porridge - - - - -		(c) Rice - - - - -	
Toast - - - - -		(d) Macaroni or vermicelli - - - - -	
Stale white bread - - - - -		6 Vegetables and Salads	
Brown bread - - - - -		(a) Fine vegetables - - - - -	
Biscuit of Friedrichsdorf - - - - -			
(Diabetic biscuit only when ordered.)		Strained - - - - -	
1 Soup		Steamed in butter - - - - -	
(a) Porridge cooked in water, strained		Cooked in salt water - - - - -	
without anything in it - - - - -		(b) Plain vegetable - - - - -	
(b) Bouillon with egg, etc. - - - - -			
(c) Soup and broth - - - - -		Steamed in butter - - - - -	
2 Egg Meals		Cooked in salt water - - - - -	
(a) Boiled eggs - - - - -		(c) Green salad with lemon - - - - -	
(b) Buttered eggs - - - - -		7 Stewed Fruit	
(c) Pancakes - - - - -		(a) Stewed fruit with sugar - - - - -	
(d) Omelet - - - - -		(b) Stewed fruit without sugar - - - - -	
3 Fish		(c) Strained - - - - -	
(a) Boiled fish - - - - -		8 Fruit	
(With fresh butter) - - - - -			
(b) Baked fish - - - - -		9 Sweets	
4 Meat *		(a) Milk pudding - - - - -	
(a) Lean meat - - - - -		(b) Pie, pudding or creams - - - - -	
Cooked - - - - -		(Without raisins, almonds, lemon	
Roasted - - - - -		peel, etc.)	
Grilled - - - - -		10 Cheese	
(b) Fat meat - - - - -		(a) Cheese with a little cream - - - - -	
(Mutton, pork, duck, goose) - - - - -		(b) Cream cheese - - - - -	
All meat can be served without sauce		(In the cooking of the dietetic meals	
		spices are not used. Pepper,	
		onion, etc.)	

#### DIET MENU

Price Mk.

Fowl will be reckoned extra.

- 1 Soup according to choice.
- 2 Meat or fish according to choice.
- 3 Vegetable or potatoes or salad according to choice.
- 4 Stewed fruit or sweets

\* The digestibility of the meat depends less on its colour than on its quality and preparation.

FIG 1—The above is a reproduction of the special chart used at Homburg, under the supervision of the Medical Society in co-operation with the different hotels and boarding-houses. At his first meal, the waiter asks the patient for his diet chart, which he has received from his doctor, and he orders his food from this.

easy and pleasant motor run of a Sunday. Nevertheless, Homburg is alive to the needs of a great modern spa, and only last month a new wing of the Kaiser Wilhelm Bad was opened, with a special installation for fango treatment. The park at Homburg is said to be the largest at any German spa (though Nauheim and Kissingen rather resented this statement) and certainly it is one of the most delightful parks in the world, with a dazzling Siamese gateway (presented by a grateful King of Siam) at one end of it. The treatment at Homburg is especially for gastrointestinal affections, obesity and disorders of metabolism. The season is from the beginning of May to the end of September, and "all-in" terms for the complete cure of three weeks (including Kur-tax, doctor's fees, baths and other treatments, and board and lodging) range from 205 marks to 310 marks (about £13:15:0 to £20:13:6), according to the hotel. Homburg was the first place on the Continent where lawn tennis was played and also to have a golf course; nowadays there is both a nine-hole and an eighteen-hole course, as well as many tennis courts.

#### BAD NAUHEIM

Nauheim, in Hesse, has made itself a world centre for the treatment and study of heart disease, and even the flower-beds throughout the town (in June) were filled with foxgloves (*digitalis*). There is a well-equipped Medical Institute, founded since the war by the State, and in charge of Professor Meyer, who is professor of cardiology at the University of Giessen, a dozen miles away. But this Institute has been put in the shade by the opening of the Kerckhoff Institute in 1929. Thus, so I was told by Professor Koch, the director of experimental pathology, is a "million-dollar" institute (a term I had heard before in America), and looks it. It was given by an American widow in memory of her husband, who was a regular visitor to

Nauheim, and includes also a large fund for helping scientific research and education, by scholarships and otherwise, in heart and vascular diseases. This institute is equipped on the most lavish scale, and is under the direction of Professor Groedel, who is professor of cardiology at the University of Frankfurt. It seems a pity that the excellent and modern Medical Institute has been repeated and gilded as the Kerckhoff Institute, but at least this engenders a healthy rivalry and may in the end make for advances in cardiology.

Graduated exercises used to be an important feature of the treatment at Nauheim, but they have been given up and the graduated walks are used no longer. The baths are of various types: brine baths free from carbonic acid, natural warm baths with a small percentage of salt and a small percentage of carbon dioxide; the sprudel baths, natural warm salt baths with a high percentage of carbon dioxide; and the sprudel stream baths, with strong carbon dioxide salt

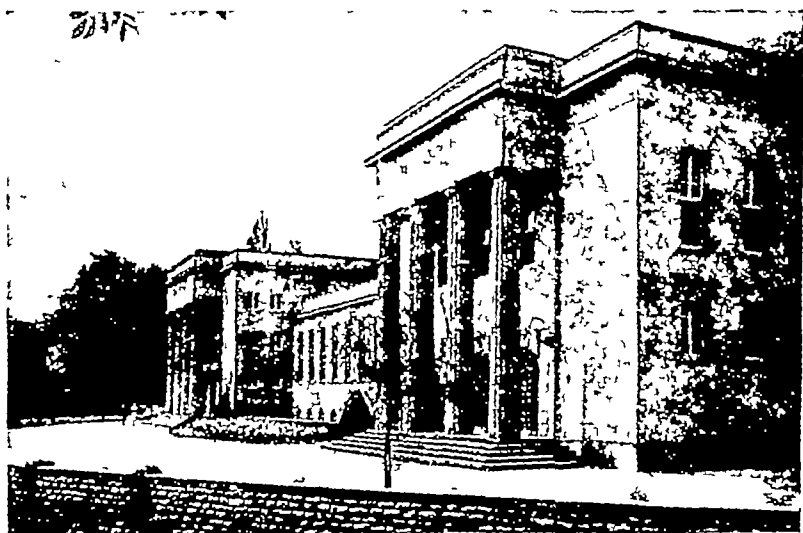


FIG. 2 —The Kerckhoff Institute, Nauheim

water flowing in and out during the whole period of the bath. The baths can thus be graded to every degree of disease and to the varied needs of the patients. The

conveying of the different kinds of waters from the natural springs to the eight bath-houses, with 368 bath cabinets, is a most elaborate underground engineering work, and up to 6,000 baths a day can be given. Nauheim also makes a specialty of the treatment of respiratory and catarrhal diseases, and there is a large "inhalatorium" of rooms equipped with a great variety of atomisers and similar apparatus. The baths cost 4 marks (about five shillings) each, and hotels from 9 to 18 marks a day.

#### BAD KISSINGEN

Kissingen, in Northern Bavaria, is a delightful town, with a quaint mediæval market place and a river running through its park and gardens, situated in a valley and surrounded by forests. The pump-room and promenade hall must be, I imagine, the largest and airiest in the world, while the great concert hall, the Regentenbau, is magnificent, and exceptionally fine concerts and operas are given in Kissingen during the season. There are over 400 baths in the different bath-houses, and all the modern methods of treatment are employed. The waters are natural saline waters with free carbon dioxide, and the cure at Kissingen is especially for diseases of the gastro-intestinal system, liver and gall-bladder, heart and blood-vessels. The cost of a cure at Kissingen is much the same as at the other spas I visited: 10 to 12 marks a day for room and board at the hotels or 15 marks (£1) a day at most of the sanatoria, including dietetic meals, medical attendance and special treatments. Kissingen is not only a well-equipped spa, but a very pleasant holiday centre, as it is within easy reach of the old university city of Wurzburg, mediæval Rothenburg and Nurnberg, and Bayreuth, the temple of Wagner. I liked very much the cheerful Bavarian atmosphere of Kissingen—but all of these spas had a friendly air and the hotel servants completely lacked the itching palm often noticeable abroad.

events may be along one of the following lines :—

(1) Arterial hypertrophy and, later, degeneration, may result from direct action of the toxin on the vessel walls, or from prolonged toxic vaso-constriction. This loss of elasticity in the arterial tree causes a rise in blood-pressure, and in a minority of cases (probably about 7 per cent ) secondary fibrotic changes occur in the kidneys, leading to benign renal sclerosis (arterio-sclerotic kidney), with albuminuria, casts, and, perhaps, nitrogen retention in the later stages

(2) Malignant renal sclerosis (chronic interstitial nephritis) may be the first effect of the toxæmia. The subsequent events may then be · (a) A compensatory rise of blood-pressure in order to maintain an efficient renal circulation through the fibrosed kidney, with the consequent development of arteriosclerosis, (b) The accumulation of toxic metabolites in the circulation, causing arteriosclerosis and resultant hypertension

(B) *Relationship between the myocardium and the above triad.* — Hyperpiesis may cause (a) aortic atheroma, leading to stenosis of the openings of the coronary arteries, with deficient blood supply to the myocardium and consequent fibrosis; (b) chronic endocarditis of the aortic valves, with stenosis of the coronary orifices; (c) a compensatory hypertrophy of the myocardium, with eventual cardiac degeneration. Also the circulating toxin may directly damage the cardiac muscle, or indirectly by sclerosing the coronary arteries.

The diagram shows the position occupied by syphilis, which does not cause a rise of blood-pressure, but which may damage the myocardium by stenosis of the coronary orifices consequent upon mes-aortitis. The essential precursor to successful treatment is accurate diagnosis; hence the importance of an etiological survey such as that attempted in the above scheme, in connection with the cardio-vascular-renal syndrome.

# Practical Notes

## *The Control of Drug Addiction*

Paul Wolff, of Berlin, says that among the many bitter legacies of the World War and post-war times, not the least difficult to combat has been the growth and extension of drug addiction, and many medical practitioners and research workers have succumbed to its seductive influence in spite of all their knowledge. According to recent statistics (Pohlisch *Monatsschr f Psychiat*, 1931, 1, 79), the number of medical practitioners in Germany who personally consume a tenth of a gram or more of morphine daily is about 500, that is to say, roughly 1 per cent of the profession. In British India, opium eating is endemic, although, as far as we know, it is decreasing rapidly, at least as far as the production of the drug goes. A stringent control is being exercised, which, however, is largely vitiated by the fact that the semi-independent native states have preserved their independence in this respect. According to a resolution of the Government, the export of opium to the Far East, apart from supplies destined for medical or scientific purposes, will have ceased within ten years, that is to say, at the end of 1935. So long, however, as opium is manufactured in quantities far in excess of those required for these serious purposes, the prevention of illegal traffic is impossible. Curiously enough, opium smoking is not customary in India. On the other hand, a certain special form of addiction is practised which apparently is peculiar to India. It consists of the use of the intact capsules of *papaver somniferum*—the so called "post," the fresh poppy heads being thoroughly macerated with water and the resulting fluid is swallowed. This practice is confined to the Punjab, where there is a total of only 6,500 addicts. Egypt has become the chief battlefield in the fight against the trade in illegal drugs, heroin occupying the most prominent position. Russell Pasha, the chief of the Cairo police, recently stated that among a population of 14 millions, there are, at a moderate estimate, some half a million addicts (Egyptian Government, Central Narcotics Intelligence Bureau, *Annual Reports*, 1929, 1930, 1931). In the central prison there is at the present time a constant population of some 7,000 addicts and dealers sentenced for participation in drug traffic. In all necessary cases these prisoners receive medical treatment in the form of withdrawal cures. It is interesting to note that, while the number of addicts in Egypt has fallen considerably, the number of dealers has risen. As to the position in Europe, according to our present knowledge, the general impression is that addiction is in all respects on the decline. Occasional cases of smuggling on a large scale, which provide sensational reports for the daily press, need not deter us from arriving at this conclusion. Great Britain, for instance, has exceptionally few alkaloid addicts. Drug addiction has for her ceased to be an acute problem, and conditions are probably much the same in Norway, Sweden and Denmark. As to the position in France, there is little information. At the present time, scientific



*The Treatment of Fissure in Ano*

J Dunbar discusses the treatment of fissure in ano, and speaks with enthusiasm of the use in the chronic form of a slow-acting local anæsthetic called A B A. This consists of anæsthesin and benzyl alcohol in oil and is made by Messrs Allen & Hanburys. The author precedes the injection of A B A with some novocain hypodermically, as this allows the fissure to be easily seen, and alleviates the pain which A B A causes for a few hours. For the injection of A B A a wide-bored needle (No 1) is inserted into the subcutaneous tissue one inch behind or in front of the lower end of the fissure, the area injected is fan-shaped and extends at least half-an-inch on either side of the fissure, and also below its base. Some of the injection is put into the sphincters, and the deeper parts of the injection are controlled by a finger in the anus. This allays spasm of the sphincter and allows the ulcer to heal — (*Glasgow Medical Journal*, July, 1932, cxviii, 41)

*The Surgical Treatment of Osteitis Fibrosa*

W. Hoffmeister, who is Chief of the Surgical Clinic in Munich, emphasizes the importance of exercising care in the method of treatment to be selected in osteitis fibrosa, because commencing sarcomata may present very similar appearances to osteitis fibrosa in the histological changes which take place in the neighbourhood. The arrangement and appearance of the giant cells cannot be used as a basis for differential diagnosis of osteitis fibrosa and sarcoma. Cystic osteitis fibrosa heals most rapidly and with greater certainty when the total diseased tissue is removed, at the same time, basic resection of all pathological tissue avoids any possibility of sarcomatous degeneration. Neither the radiogram nor the histological findings are conclusive for diagnosis, and as long as there is no clear line of demarcation between benign and malignant changes of bone, the method of treatment which a surgeon may adopt should be clear and definite. Thus for the treatment of osteitis fibrosa or of a commencing disease of the bone which in appearance and in findings presents a similar picture to osteitis fibrosa the following is recommended. Small cysts are chiselled out of sound bone, large cysts are resected and the defect is bridged by bone transplantation. If the case is one of osteitis fibrosa without tendency to sarcoma, then the clearing out of the subperiosteal tissue prevents recurrences. Resection of the bone does not produce deformity of the limb, since the bone may be completely regenerated from the periosteal covering. Should, however, a sarcoma be dormant in the central part of the bone beneath the osteitis fibrosa, then early resection offers the best chances of satisfactory outcome. Resection may also be employed when the tumour has broken through the bone but is still circumscribed with regard to the soft parts. If on operation it is found that the tumour has broken through into the soft parts, then the diagnosis of sarcoma is confirmed. In such cases alone is it necessary to carry out amputation or exarticulation, which would produce crippling of the limb — (*Deutsche Zeitschrift für Chirurgie*, May 22, 1932, cxxxvi, 191)

# Reviews of Books

*A Short Practice of Surgery* By HAMILTON BAILEY, F.R.C.S., and R. J. McNEIL LOVI, M.S., F.R.C.S. Two volumes. London H. K. Lewis, 1932. Vol. I. Pp. 530. Figs. 269. Price 20s.

DESCRIBED in a preface as a survey of general surgery, this book is presumably intended to contain such surgical information as is exacted of the qualifying student, and to convey it in a manner suitable for revision reading. In the present volume we think the authors have succeeded, though the standard of information varies in the different chapters. The virtues of the book are its readableness, its print, its illustrations, its one vice the certainty attributed to controversial and even inaccurate matter. A habit of pedagogy is thus betrayed to which, though it is upheld by many of the more dramatic teachers, we cannot lend our approval. For example, the chapters on the pharynx contain some surprising pronouncements: pressure diverticulum is said to originate in the region of a branchial cleft from the Lannier Hackerman area, which is shown in an illustration as laterally placed immediately behind the trachea and thus in the œsophagus. We have not seen a cervical pharyngeal pouch that was not median and posterior in origin, thus corresponding to the usual description of position of the Lannier triangle. In the surgical treatment of the same condition, a two stage operation is said to be necessary to prevent mediastinitis, a fallacy long ago exploded by Trotter. Considerable space is properly devoted to fractures, and the clinical accounts of the various injuries are excellent, though we cannot agree that there is a growing tendency towards operative treatment of fractures of the femoral shaft. Nor can we subscribe to the recommendations as to the treatment of Colles's and Pott's fractures, which we regard as reactionary. The sections on the breast, the urinary and genital tracts are very good and deserve the space allotted to them. The authors have not resisted the temptation to reproduce in this short text book illustrations of their rare cases, sometimes to the exclusion of commoner forms of disease and injury. This weakness must be pardoned, however, as the drawings, photographs and radiograms scattered profusely throughout the text are among the best we have ever seen in a surgical text-book, both in execution and reproduction, on which we offer our congratulations to authors and publisher.

*Mothercraft, Antenatal and Postnatal* By REGINALD C. JEWESBURY, M.A., D.M., F.R.C.P. London J. & A. Churchill, 1932. Pp. ix and 178. Illustrations 21, 13 in colour. Price 10s. 6d.

PART I of this book is by John S. Fairbairn and deals with the relation of mothercraft to other aspects of maternity work, much useful information is given on antenatal care, intranatal and puerperal management. In Part II Professor Mellanby describes shortly the physiology of lactation and this article is perhaps the best in the book. In Part III Dr Jewesbury writes on the feeding and management of infants, weaning, some of the difficulties met

death may not occur till adolescence or even early adult life In the routine examination of the nervous system ophthalmoscopic inspection of the fundus is surely at least of equal importance as an examination of the pupillary reflexes and the knee-jerks

*The Use of Lipiodol in Diagnosis and Treatment* By the late Professor J A SICARD, Physician at the Necker Hospital, Paris, and J FORESTIER Oxford University Press London Humphrey Milford, 1932 Pp ix and 235 Illustrations 50 Price 16s

THIS clinical and radiological monograph on a means of diagnosis which was first brought to the notice of the profession by these authors in 1921, is both authoritative and comprehensive, as is borne out by a bibliography of 39 pages As the senior author died early in 1929-30, the brunt of the work in writing this volume must have devolved upon his pupil, Dr J Forestier The diagnostic use of lipiodol is chiefly familiar in connection with diseases of the nervous and respiratory systems, and the authors consider that in broncho-pulmonary work it will undoubtedly supplant the bismuth insufflations recommended by Chevalier Jackson, but it can also be employed in diseases of other parts of the body, such as the male and female generative organs, the urinary tract, the blood-vessels, nasal sinuses, and in estimating the secretory activity of the stomach These uses are described in successive chapters of this successfully illustrated work, the radiograms in which are of a high order of merit The contra-indications to the employment of lipiodol are few, namely, extreme sensitiveness to iodine, active tuberculosis with fever, and a very poor condition of the patient When in a state of perfect preservation lipiodol is well tolerated by the tissues, the only ones which react are highly inflamed serous membranes, which do so because they set free some iodine But if lipiodol is kept and turns of a brownish tint from the liberation of iodine, a severe reaction may follow, the authors feel certain that all accidents ascribed to its use are due to the employment of a stale compound The therapeutic value of lipiodol is not so generally known, but in nine cases out of ten an epidural injection will rapidly cure lumbago or rheumatoid sciatica Injections into the sacro-iliac joint, or even in its vicinity, give brilliant results in so-called rheumatic sciatica Benefit also follows the injection of lipiodol into bronchectatic cavities, and after combined epidural and subarachnoid injections in enuresis

*Notes for Diabetics* By one of them Sydney Angus and Robertson, 1932 Pp xiii and 98 Figs 4 Price 5s

As Professor Harvey Sutton points out in an appreciative foreword, this is a remarkable account of an intelligent layman's experience and gives a vivid description of the disease Having tried a number of quack remedies he warns his readers against such *soi-disant* infallible remedies, and has been through an attack of coma receiving 400 units of insulin in the space of two hours This is an attractively and brightly written book with quotations from, and acknowledgments to, Dr E P Joslin of Boston, Professor H Maclean, and Dr Robert Hutchison

# Notes and Preparations

## DRÖITWICH

Of all the English spas, Droitwich seems to us the one which has the greatest possibilities, for its waters are unique in Europe, holding in solution about 30 per cent of natural salts, about ten times the density of sea water, and more salt than the Dead Sea. Still, if it were to realize its possibilities and rival the great spas of the Continent, Droitwich would lose much of its charm, for at present it is still a pretty little country town, picturesquely situated in the leafy county of Worcester, although it can treat 500 patients a day and expects in time to be able to treat 1,000 a day. The chief constituent of the waters is sodium chloride (296,140 milligrams per litre, as expressed by the old notation), or, expressing the mineral constituents as ions, the chief constituents are sodium (117,313 milligrams per litre, international standard), and calcium (1,328 milligrams per litre). There are two bathing establishments, the Royal Baths, opened in 1836, and the St Andrew's Baths, erected some fifty years later, but both buildings have been considerably remodelled as well as extended in recent years. The Royal Brine Baths Clinic was opened in July, 1931, primarily for the treatment of patients whose means necessitate economy and who would otherwise be unable to take the baths at Droitwich, and a modern building, formerly the Royal Hotel, has been converted for this purpose, with up-to-date equipment, it is in close proximity to the Royal Baths. The conditions treated at Droitwich are especially all forms of rheumatism, but also certain heart disorders, nervous exhaustion, anæmia, and injuries of tendons, muscles and joints, the treatment is also a general tonic in convalescence after most illnesses.

## GLUCATOR

The glucator is a simple apparatus, made by Messrs Napp (3 and 4, Clement's Inn, Kingsway, London, W C 2), for the rapid and accurate quantitative estimation of sugar in the urine, two or three minutes only being required. The apparatus is neat and compact, and costs half-a-guinea, it is apparently a modification of Fehling's test, but by marking of the test tubes and pipette and with the aid of a table that is given, it is easy to calculate the amount of sugar in the urine passed in 24 hours in grams or in ounces.

## G L AMPOULES

The new G L ampoules are of a pattern that has been used for a considerable time on the Continent, their distinctive feature being that they open easily with a clean break and have no "dead" space in which part of the solution may accumulate and become

unavailable. A ridge on the short neck of the ampoule is its special breaking point, and after drawing the opener briskly across both sides of the bridge, the head can be snapped off cleanly, without splintering. These ampoules are manufactured in England for the Glaxo Laboratories (56, Osnaburgh Street, London, N W 1) from glass which conforms to the requirements of the new British Pharmacopœia. The drugs contained in them are accurately standardized by chemical or physiological means or both, and the packed products are sterile and ready for injection. Most drugs used hypodermically are available in solution in the new G L ampoules, including morphine, hyoscine, strychnine, digitalin, ephedrine, adrenaline and procaine.

#### IODIZED MOOGROL

Iodized moogrol is a mixture of esters of the acids of the chaulmoogric series combined with 0.5 per cent of iodine, made by Messrs Burroughs Wellcome & Co (Snow Hill Buildings, London, E C 1). The addition of the iodine markedly reduces the irritating properties of the ethyl esters. Preliminary clinical experience confirms that iodized moogrol is less irritating than plain moogrol. At the Leonard Wood Memorial Conference on Leprosy, held at Manila, in January, 1931, the use of iodized esters, particularly by the intradermal method, was strongly recommended. The intradermal or intracutaneous method has been employed by the Philippine workers for some years and the advantages claimed are that it produces a more rapid resolution of the superficial lesions and that it is relatively free from general and local reactions.

#### STIPOLAO

The radiological examination of the gall-bladder by the aid of radio-opaque substances has now become a commonplace of surgical diagnosis, though improvements towards improving the efficiency and decreasing the toxicity of the substances used are still to be looked for. Messrs Burroughs Wellcome have just brought out a new preparation, "Stipolao" brand of sodium tetra-iodo-phenolphthalein and a special acid mixture, in two tubes, the contents of which are mixed together immediately before administration. This seems more effective than previous preparations.

#### BOLLINGER CHAMPAGNE

The well-known Bollinger champagne has long had a reputation with gourmets, but recently Messrs Bollinger have been putting up their "Special Cuvée" in quarter bottles, for the use of invalids. "Special Cuvée" is a non-vintage wine, and therefore less expensive than a favourite vintage year, but the demand for it has been so great that vintage wines are used for it. It is very dry, and can be especially recommended for use in hospitals and nursing-homes. Nowadays Bollinger champagne can be obtained through any wine merchant.

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WOODMAN, MUSGRAVE, M.S.,  
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Lond., appointed Senior Resident Medical  
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Marylebone Road, N.W.



# HEPATEX P.A.F.

## References —

<i>Brit Med Journ</i>	, Feb 27, 1932,	p 400
" "	" " " "	p 401
" "	" " 13, "	p 272
" "	" " " "	p 273
<i>Lancet</i> ,	November 7, 1931	p 1,022
"	October 10, 1931	p 791
<i>Glasgow Med Journ</i> ,	Dec 1931,	p 345

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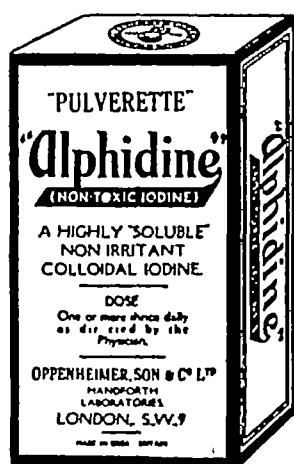
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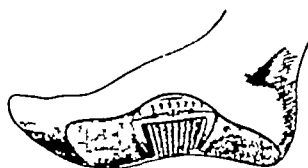
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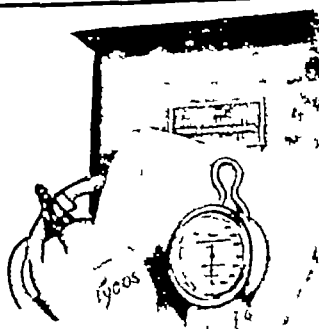
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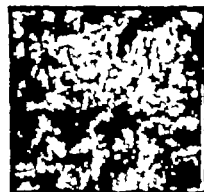
iii By the introduction of the filter tip the palate loses nothing, but the voice and throat pain immeasurably as the irritants are held in check without impairing the flavour or delicate character of the smoke. This is the central advantage to be gained from the filter tip.

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May, 1931.

p 584

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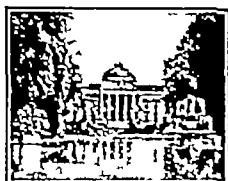
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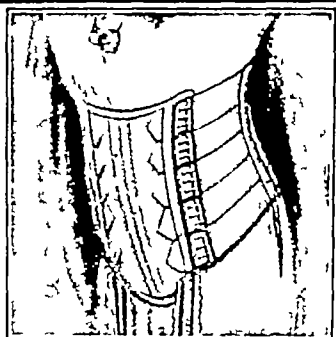
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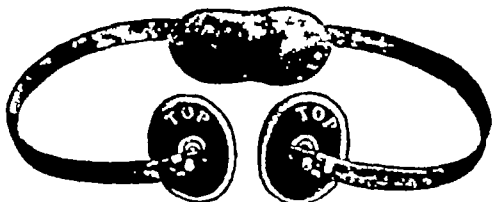
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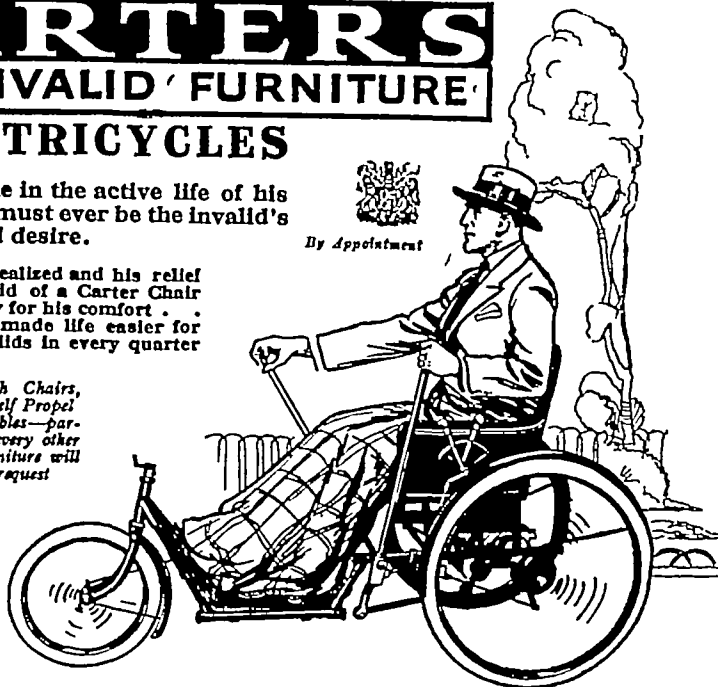
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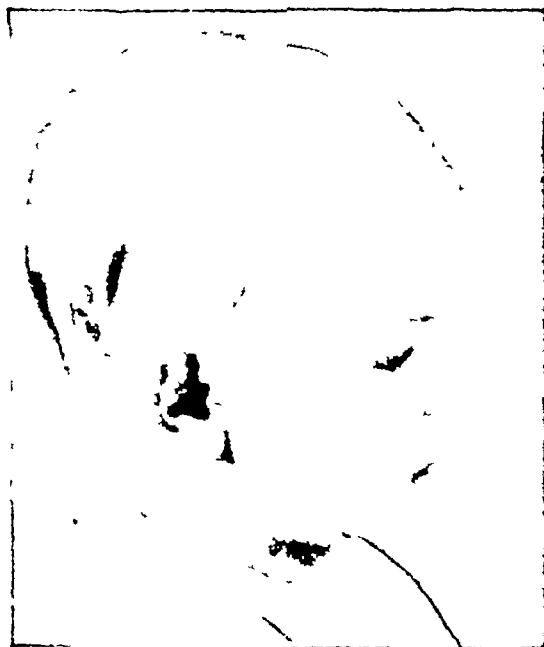
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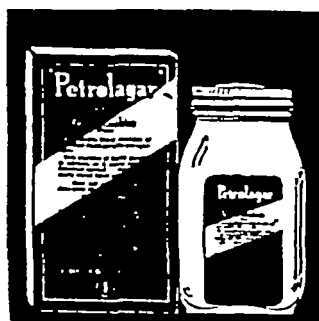
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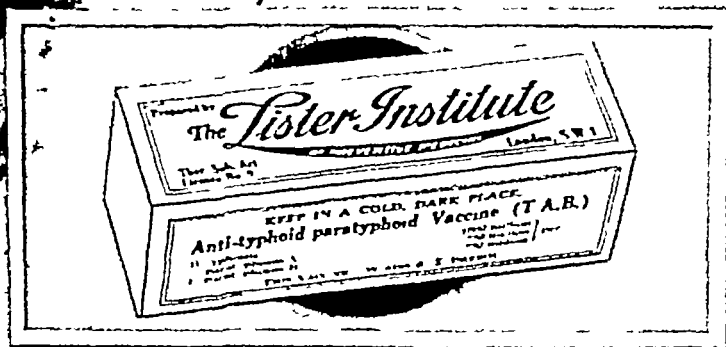
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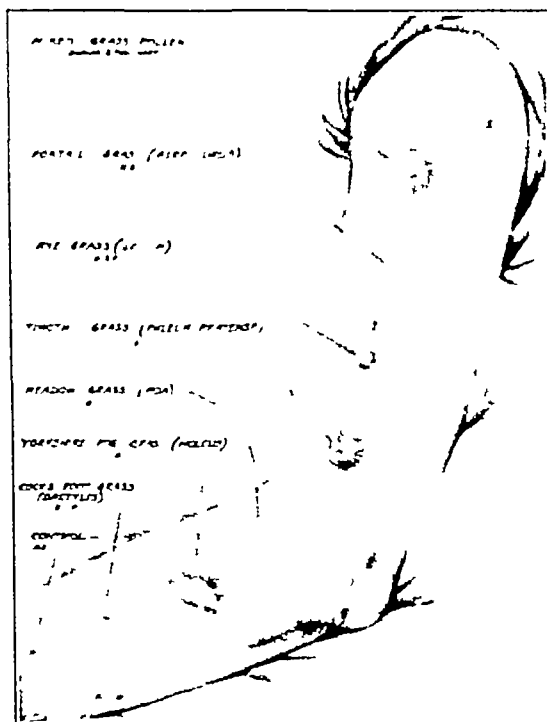
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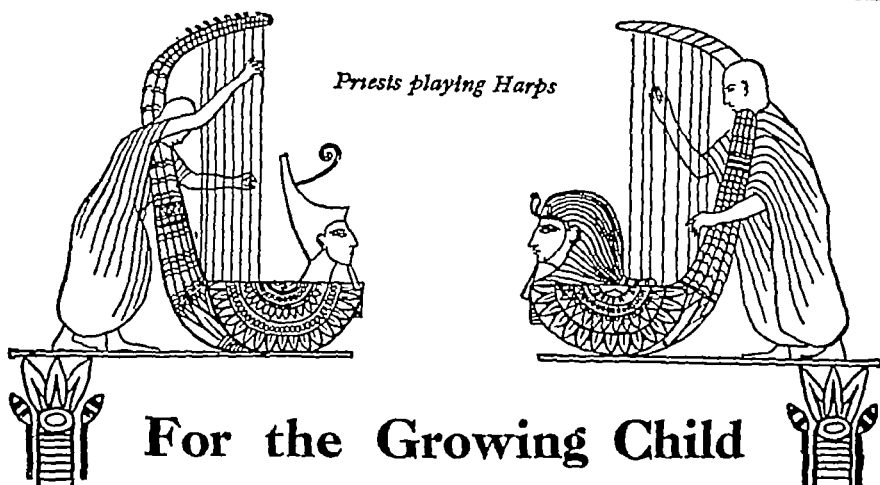
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Children love the deliciousness of "Ovaltine" and thrive remarkably well upon this complete food. It is of unsurpassable value as a meal-time beverage in place of tea, coffee or other beverages.

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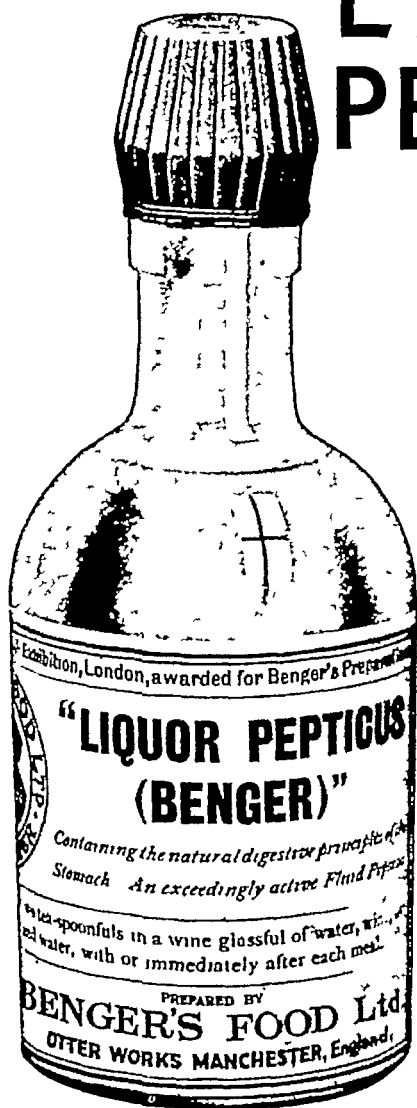
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Sir William Roberts, M.D., F.R.S

Liquor Pepticus Benger is a concentrated and highly active fluid pepsin in acid solution which acts particularly upon meat, eggs and other proteid foods

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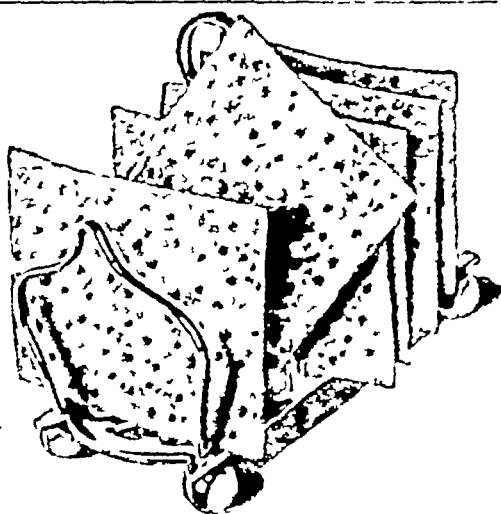
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Analysis gives the following comparison with wholemeal bread

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Protein - -	10.32	6.30
Fat - -	7.90	1.20
Carbohydrates, etc	74.28	46.30
Mineral matter, ash, etc	2.60	1.20
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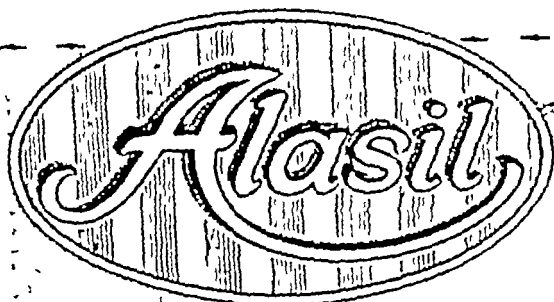
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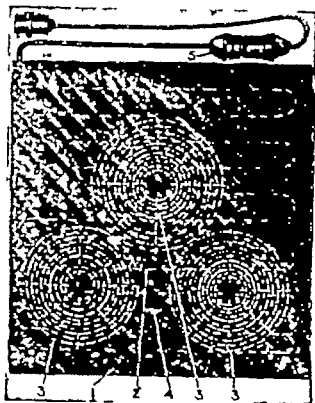
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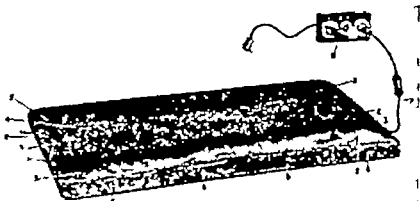
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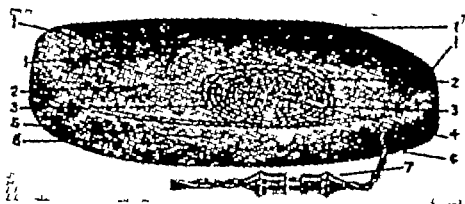
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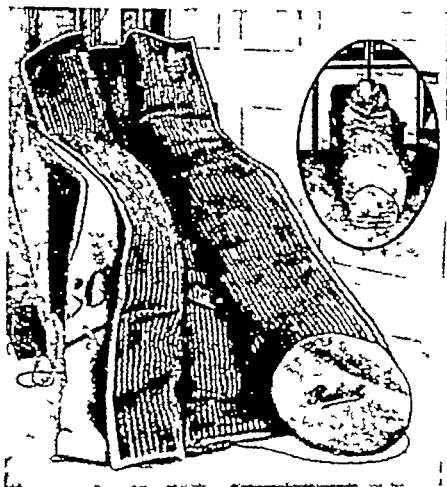
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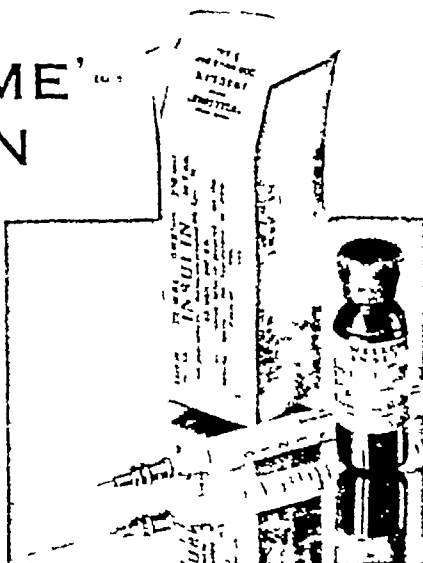
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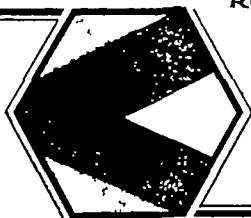
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# THE PRACTITIONER

No 769

JULY, 1932

Vol CXXIX

## 1832-1932 and the British Medical Association

THERE are several analogies between 1832, the year of the great Reform Bill, and the present year, with its National Government. A hundred years ago the effects of the long-drawn-out Napoleonic wars lay heavy on the country; political agitation was acute, financial distress was rampant, and cholera and influenza had ravaged the country. From a medical aspect also reminiscence supplies some points of interest; the process of reconstruction—to employ a word of more recent application—was in being a hundred years ago, there was a new birth of medical societies, which had been a prominent development in the last quarter of the eighteenth century under the leadership of John Hunter, George Fordyce, John Fothergill and John Coakley Lettsom in London, and Andrew Duncan, Sen, in Edinburgh. Under the Esau-like hand of Thomas Wakley the *Lancet* had started on its vigorous career in 1823 and was justifying its name by its incisive treatment of abuses. March, 1832, saw the appearance of the first number of *The Dublin Journal of Medical and Chemical Science. Exhibiting a Comprehensive View of the latest Discoveries in Medicine, Surgery, Chemistry and the Collateral Sciences*, which was the first successful medical journal in Ireland, and after various changes of name now celebrates its centenary as the *Irish Journal of Medical Science*.

In this connection it may be mentioned that in 1832 Sir Dominic Corrigan published his classical account of aortic regurgitation and the characteristic ("leaping") pulse which bears his name. In the provinces, where medical societies had been started in the previous century, fresh ones were formed—the Halifax and District in 1822, St. Helens in 1826, and Nottingham in 1828. Medical schools were started, for example, at Sheffield (1828), Leeds (1831), and Bristol (1833), which are now incorporated in flourishing universities. The teaching of anatomy was greatly helped by Lord Warburton's Anatomy Act of 1832, which provided that all unclaimed bodies should, under proper restrictions, go to the medical schools.

As every medical practitioner knows, the British Medical Association celebrates its centenary this month in London under the presidency of Lord Dawson of Penn, the President of the Royal College of Physicians of London. The Association was founded in 1832 at Worcester as the result of the devoted energy of Sir Charles Hastings (1794–1866), physician to the Worcester General Infirmary, and was then called the Provincial Medical and Surgical Association. On July 19 of that year fifty medical practitioners met in the board-room of the Infirmary and established the fundamental principles of the Association, which it was agreed should hold an annual meeting in one of the provincial towns, changing the place of meeting each year. When the Association met at Bristol in the following year it had a membership of 316, and it is appropriate that now, in its centenary year, it has increased more than a hundredfold. From this small beginning it has steadily expanded to become, indeed, the association of the medical profession of the British Empire. In 1856, as the *Annual Handbook* of the Association now records, its name was changed to the British Medical Association, a London society with that title, founded in 1836, having come to an untimely

end In London it met for the first time in 1862, with a membership of 2,120, under the presidency of Sir George Burrows, and subsequently in 1873 with Sir William Fergusson as president, in 1895, Sir John Russell Reynolds being president, and in 1910, when Sir Henry Butlin occupied the chair All the presidents of the London meetings had before, at the time, or after been presidents of the Royal College they respectively adorned During the years 1915-19 the usual annual meetings were suspended, but business meetings (and in 1919 a scientific meeting) were held in London under the chairmanship of Sir Clifford Allbutt

From 1833 to 1853 the Association published a yearly volume of *Transactions*; in January, 1853, the *Association Medical Journal* appeared, which was a continuation of the *Provincial Medical and Surgical Journal* dating from 1840, and in 1857 it adopted the present title of the *British Medical Journal* The medical profession owes much to the succession of able and energetic editors who have carried on this difficult task, and at this centenary many will turn with grateful affection to the memory of that great man, Sir Dawson Williams

HUMPHRY ROLLESTON



thousand cases of duodenal ulcer The pylorus forms a sharp line of division between the two and is rarely transgressed by a duodenal ulcer, almost never by a gastric ulcer

It is, I think, important to distinguish between acute and chronic gastric ulcers Acute ulcers are commonly if not invariably associated with toxæmia, an infection in the mouth, on the skin, in the appendix or elsewhere may be the primary cause of those minute shallow erosions of the stomach or duodenum which cause dyspepsia, hæmorrhage or perforation Hæmorrhage and perforation, though themselves acute, are, with few exceptions, the evidence not of acute but of chronic ulceration which has assumed fresh activity In a series of gastric ulcers observed by Professor Stewart and myself over a period of twelve years we found that in 61 cases where death occurred from perforation, the ulcer was of the chronic type in 60, in 14 cases where death occurred from hæmorrhage, the ulcer was of the chronic type in 13 In the acute case the ulcer was a terminal condition associated with advanced disease, and hæmorrhage was not the determining cause of death In a similar series of cases of duodenal ulcer during the same period, this truth also held good, 12 deaths from hæmorrhage all occurred in cases of chronic ulcer, in 117 deaths from perforation there were 109 cases in which the chronic ulcer had given way, in 12 cases acute ulcer was present, so that there were 4 cases in which both acute and chronic ulcers were found—in every one it was the chronic ulcer which had perforated.

Chronic gastric and duodenal ulcers, as Hurst and Stewart demonstrate, have their origin in acute ulceration which for some reason or reasons not fully understood, is prevented from healing which as a rule is swift and unhindered Chronic ulcers, too, undoubtedly heal In their sound healing they may produce conditions requiring relief by surgery “Pyloric stenosis”

is virtually always "duodenal" stenosis, contractures in the stomach are usually in the body of the organ and cause the condition known as "hour-glass" stomach. Professor Stewart finds evidence of open or healed ulcers in about 5 per cent of the bodies examined on the post-mortem table in Leeds. Often no history of any period in which symptoms were present is found in the clinical notes or is to be obtained from relatives. The fact that healing does occur affords, however, a strong—indeed, an undeniable—plea in favour of an adequate trial of medical treatment. No surgeon upon whose judgment I would rely suggests operative measures for anything but the rebellious cases or those in which the ulcer is large and incoercible; emergencies, of course, excepted.

#### SYMPTOMS

The chief clinical symptoms of ulcer of the stomach are pain, vomiting, and hæmatemesis, and of these the really important one is pain. The supremely significant feature with regard to pain is its punctuality. In the same patient after the same meals it appears with the most exact regularity after the same interval of comfort. If a breakfast is taken at 9.0 a.m., and pain appears at 10.0 a.m. on one day, a similar breakfast on all other days will be followed by the same hour of comfort and the same appearance of pain at the due moment. A time-table of one day, then, fits any other day. Far less attention than it merits is given to a searching analysis of a day's routine. A patient will not seldom tell you he can "set his watch" by the time-incidence of his suffering. The periodicity of the pain is, of course, altered by variations in the quantity and quality of the food and by irregularity of meals.

A point which is well worth attention concerns the rhythm of pain. In cases of gastric ulcer pain

a gastric ulcer is seen we can never be quite confident of its presence. We must walk by sight and not by faith. I think it is quite true to say that no merely clinical diagnosis of any condition is so apt to be fallacious as is that of "gastric ulcer." Yet cases are met with very frequently in which this diagnosis has been made upon the flimsiest clinical evidence. When such a diagnosis becomes the warrant for medical treatment, when such treatment is expanded into a "system," and when statistical results of such systems are offered for our consideration and respectful admiration, we cannot but feel aghast at the mountain of falsity which looks so imposing and is in truth so unreal. Until we have learnt far more than we know at present, might we not resolve to apply the term "gastric ulcer" only to cases in which the diagnosis is certain, and to judge of the efficacy of therapeutic methods, and of the pathological destiny of the lesion, only in such proven cases?

The radiological evidences of ulcer have been described fully by Carman and others. The niche or accessory pocket has been well seen in exactly one-third of our cases; the abiding spasm of a zone in the stomach, the "notch" on the greater curvature, seen with or without the crater, indicates, just as certainly as the niche, the presence of an ulcer. The condition of the stomach in respect of its general muscular tone is now always observed, it is interesting to find that the orthotonic, the hypotonic, and the hypertonic types occur with exactly equal frequency in cases in which a gastric ulcer has been proved to exist. In cases of duodenal ulcer an orthotonic condition was found in 44 per cent., a hypotonic in 24 per cent., and a hypertonic in 32 per cent. Deformities of the duodenal bulb are as certain an evidence of ulcer as are the niche and notch in cases of gastric ulcer. When stenosis has resulted from the firm healing of an ulcer, whether in the stomach or duodenum, or both,

the radiological examination reveals the clearest proof of the conditions present.

#### TREATMENT

This may be either medical or surgical. Before attempting to assess the value of medical treatment of either form of ulcer, it is essential to know whether an ulcer is indeed present. This seems, perhaps, a foolish and unnecessary qualification. But a not inconsiderable acquaintance with the literature of this subject, and friendship with many authors of eponymous methods of treatment leave me in considerable doubt as to whether this necessity is even to-day adequately recognized. It is improper and untrustworthy to speak of the results of treatment of gastric ulcer if we are not sure that an ulcer is certainly present before treatment begins. No small part of the literature of this subject is encumbered with error and, what is worse, with half truths.

Failure to observe this principle of verification is not solely the prerogative of the physician. I have operated many times upon patients who have had gastro-enterostomy performed for ulcers and have been unable to find any slightest trace of the supposed lesion. They were often cases in which symptoms never warranted a diagnosis of ulcer. There can be no doubt that operations are done in many parts of the world by incompetent surgeons on grounds which are quite indefensible. Before either medical or surgical treatment is adopted, the existence of the ulcer should, therefore, be indisputable. For such accuracy in diagnosis, clinical and radiological methods will be fully adequate.

Here let me affirm that medical treatment should in every case of gastric or duodenal ulcer have a fair opportunity of assisting healing in the ulcer. The problem, however, is not a simple one. I have watched the rate of healing of gastric ulcers in certain cases

I have selected them because the examinations were all made by the same chemist, who was then in my private service

The value of the "triple carbonate" in cases of duodenal ulcer might at once be expected to be considerable. The use in gastric ulcer is, so far as I can judge, considerably less valuable, as also we might foresee

Our chief reliance then should be placed upon rest, diet, climate and other methods which require time, circumstance and opportunity for their adequate fulfilment. The great disadvantages under which medical treatment labours are therefore obvious. The vast majority of our patients cannot afford adequate rest, the hospitals have no beds to spare for those not requiring more active treatment, the quick relief from symptoms which comes from slight changes in diet, the unrest of the patient, all these circumstances militate against a recognition of the supreme necessity of untiring care in respect of every detail of treatment. What should be our diet chart for these two groups of cases, the gastric and the duodenal, after the first stage of treatment is over? I think the same diet may safely be given to both, but the "triple carbonate" only to those in whom a high acidity has been revealed by the test-meal. To all patients charts similar to the following should be given —

DIET CHART *For patients who have passed the first stage in the medical treatment of gastric or duodenal ulcer, or who have undergone operation*

<i>Breakfast</i>	-	-	Cream of wheat, sugar, cream Lightly boiled or poached egg Steamed fish, fried fish with "crust" removed China tea, weak Marmalade or other "Tiptree" jelly Bread one or two days old, and if toasted only lightly browned Fresh butter freely
10 30-11 30	-	-	About 5 to 10 ounces of milk or Vichy water with a small teaspoonful of "triple carbonate," for all in whom gastric acidity is high



alcohol and tobacco. Tobacco is "the worst enemy" of patients suffering from duodenal ulcer. In these cases the acid content is often high, it plays a part no doubt in the development and perpetuation of the ulcer, it is increased by smoking. Many years ago I first pointed out the harm done to those suffering from duodenal ulcer by tobacco. And to clear up the difficulty I had a large number of test-meals taken upon students, at the time when they were smoking, and compared them with others taken when tobacco had not been used for three or four hours. Tobacco always increased the amount of hydrochloric acid, or excited a prolonged secretion.

#### CONCLUSIONS

(1) Ulcers of the stomach or duodenum do heal, and remain soundly healed for years.

(2) When healed, stenosis in the body of the stomach or in the duodenum may result, and surgical treatment for a mechanical deformity then be necessary

(3) Medical treatment should always be given a first and a second trial, if it then fails, success in later efforts is extremely improbable

(4) The present methods of medical treatment are proved by experience to be of little value, and are highly dangerous. The majority of patients who die from either of these diseases succumb because medical treatment has failed to relieve them. Medical treatment undoubtedly has a mortality greatly exceeding the highest mortality following any surgical procedure adopted for chronic ulcers of the stomach or duodenum

(5) The failure of medical treatment is largely due to its insufficiency. To be successful such treatment must be rigorous and protracted. The loyal co-operation of the patient is essential. Very few patients now receive any treatment offering a reasonable prospect of healing of the ulcer

(6) When medical treatment has failed, surgical

treatment must be adopted, and should not be delayed.

(7) Experience shows that surgical treatment, adopted when medical treatment has failed, is far less dangerous and far more effective in attaining our object than medical treatment, the immediate and remote mortalities are smaller, the after-effects far more satisfactory.

(8) The failures of operative treatment by competent surgeons are due chiefly to the development of fresh ulceration at the new anastomosis.

(9) The causes of this new ulceration lie partly in the diathesis of the patient, and partly with details of the operation.

(10) Surgical treatment should consist in the eradication of the ulcer or ulcers, by gastrectomy if the ulcer lies in the stomach, by a short-circuiting operation combined with destruction of the ulcer when it lies in the duodenum. Balfour's method and Walton's method have proved excellent in the hands of their authors. Other complementary procedures within the abdomen must be observed.

(11) Gastrectomy in the treatment of duodenal ulcer is more dangerous than gastro-enterostomy, and does not appear to give any better late results, if, indeed, its results are so good. It should, therefore, have no place among surgical methods for the treatment of duodenal ulcer at the present time.

(12) The medical treatment of gastric ulcer and of duodenal ulcer is, perhaps, not so much a medical problem as a problem in social economies. Rest in bed, freedom from anxieties, abstinence from work, complete repose, in fact, are essential if treatment is to have the best chance of success. A counsel of almost unattainable perfection.

(13) The connection between gastric cancer and gastric ulcer is so clear that gastrectomy alone, wherever it is practicable, should be regarded as the appropriate surgical treatment for chronic incoercible gastric ulcer.



# Infections of the Hands and Fingers

By JOHN FRASER, M C , M D , CH M , F R C S E  
*Regius Professor of Clinical Surgery, University of Edinburgh*

IT would be difficult to over-estimate the importance of acute infections of the hands and fingers. They are relatively common conditions, because our hands, being unprotected, as they so often are, by artificial coverings, are constantly liable to minor trauma, and to influences which are potential sources of infection. In view of the possibilities the wonder is that hand infections are not more frequent.

*The origin*—When we ask ourselves how the infection enters the part we naturally think of wounds and of surface abrasions, but we do well to remind ourselves that around our nails there are areas peculiarly liable to act as avenues of infection, apart from the possibility of trauma, cul-de-sacs and sulci which constantly harbour organisms, arrangements of delicate epithelium so easily damaged unless certain simple precautions are taken. There is no doubt that the nail areas are among the most frequent sites of origin of hand infections, and so far as the bacteriology is concerned, the staphylococcus and the streptococcus are the common agents.

*The clinical considerations.*—In discussing the clinical bearings of hand infection it may be convenient to subdivide the errors into groups, adopting a classification appropriate to the individual parts in which the infection is manifest. On this basis I propose to review . (a) infections around the nail ; (b) infections of the finger pulp ; (c) infections of the thecæ or tendon sheaths ; (d) infections of the hand spaces

## 101. INFECTIONS AROUND THE NAIL

, When mention of the human nail is an interesting

question. Phylogenetically nails are hairs glued together by a collagenous material, and morphologically they represent the hoofs and the claws of the lower animals. As body structures they are so familiar that it may seem unnecessary to elaborate their structure and arrangement, yet there are certain details of considerable surgical significance which it is well to remember. The nail-plate rests upon the underlying column or nail-bed, the two structures being intimately related, though a plane of cleavage exists. The nail edges are bent at a right angle to the plane of the nail-bed, so that a convex surface is presented to the adjacent skin, and a further protection is afforded at the line of contact by the existence of a ridge of cornified epithelium. The arrangements are thus designed to prevent damage of delicate epithelium by a rough or irregular nail edge. The base or root of the nail is embedded in an epithelial sulcus, and from the overlying skin a thin and delicate pellicle—the eponychium—extends over the free surface of the nail-plate. As the nail grows the eponychium, if adherent, tends to be so stretched that it splits and tears, leaving “ragæ”—a frequent error in the fingers of those who are careless about the hygiene of their hands. At the nail edges and in the eponychium therefore we find such tissue arrangements as facilitate abrasions with their attendant risks. Infections involving the nail are conveniently grouped under the term “paronychia.”

The infection may be introduced by way of a wound of the nail-bed, as when a spicule of wood is driven underneath the nail, more frequently the source is an abrasion of the epithelium at the nail edge or a tear of the eponychium. Once originated, the process tends to spread, and, if neglected, the likelihood is that the infection makes its way beneath the nail-plate into the substance of the nail-bed. Paronychias, whatever their type and origin, are always painful, but the symptoms are exaggerated when there is a

form a subcutaneous whitlow.

The subcuticular whitlow is not a serious affair unless it penetrates to a deeper level. In its treatment, it is sufficient to remove the cuticular layer of the blister and to apply an antiseptic moist dressing. The

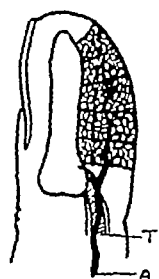


FIG 2  
Structure of the  
finger pulp  
Site of incision  
in cases of sub-  
cutaneous  
whitlow indicated  
by dotted line  
T = tendon  
A = artery

subcutaneous infection, on the other hand, may be a matter of great consequence. Let me recall certain anatomical facts relative to the finger pulp. The deep surface of the skin in this area is related to the periosteum of the underlying terminal phalanx by thin, cordlike bands of fibrous tissue, the relatively large amount of subcutaneous fat in the finger pulp is sharply limited proximally by the close relationship between the underlying tendon sheath and the crease of the distal interphalangeal joint, while the digital artery, in passing to supply the finger tip, gives off a small nutrient vessel which enters the

base of the first phalanx (Fig 2).

Now, recalling these points, imagine for a moment the position which is liable to arise in the presence of a spreading infection of the finger pulp. For a time the laxity of the tissues permits considerable swelling, but, if this continues unchecked, the tension ultimately reaches a point at which complications are liable to occur. Under the increasing tension the infection extends to a deeper level, mainly along the fibrous strands which connect the deep skin surface with the underlying phalanx. It is by this means that infection of the phalanx tends to complicate sepsis of the finger pulp. Of greater consequence, however, is the effect of the increasing tension on the related blood-vessels. As the digital vessels pass under the terminal interphalangeal crease to enter the finger tip they are submitted at this point to a certain amount of increased pressure, even under normal conditions, but when the

finger pulp is the site of infection with its greatly increased tension, the pressure on the vessels is augmented, and it is believed that the interference may become so serious that the nutritional supply of the phalanx is endangered. This supposition is, perhaps, more theoretical than real, but, judged by anatomical standards, it must be regarded as a possibility, and it is therefore worthy of mention.

The clinical features of finger-pulp infection have no special distinctions apart from their liability to be associated with involvement of the underlying bone. There is the throbbing pain of increased tissue tension, swelling, and tenderness to pressure. How should such a development be treated? To begin with, we employ the simple conservative measures outlined in connection with nail infections, and when we are satisfied that the infection is localized, and that pus formation is occurring, the part is incised and drained. The best incision is probably one which outlines a

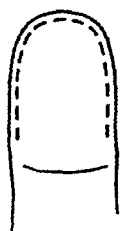


FIG 3  
Incision for  
infections  
of pulp of  
finger

U-shaped flap (Fig 3), a narrow, sharp-pointed bistoury is passed transversely through the tissues in front of the phalanx at such a level as to run no risk of damaging the phalangeal attachment of the flexor tendon and its theca. From this point of transfixion the incision is carried parallel to the long axis of the finger towards the finger-tip. The flap so outlined is lifted gently upwards, a narrow portion of dental rubber is passed transversely through the base of the wound, and the flap is then allowed to fall back into place. This method has certain advantages, it affords adequate drainage, there is little risk of damaging and so infecting the tendon sheath or the phalanx, the scar does not tend to become adherent to the bone, while the nerve endings, so essential to the healthful function of the finger-tip, are not seriously interfered with. An anterior midline incision should be avoided, as it

is apt to be associated with one or more of the errors which are avoided by the flap method.

#### INFECTIONS OF THE TENDON SHEATH (THECAL WHITLOW)

These are invariably of great significance, because of the possibility that serious functional disturbance of the related finger or fingers may ensue; not only so, but the position of the infection is such that it may readily extend into other portions of the hand or forearm with correspondingly serious results

*The surgical anatomy of the tendons and their sheaths.*—The sheaths or thecæ are the fibrous coverings which both protect the tendons and act as channels within which the tendons run. The sheaths may be subdivided into two groups—the digital flexor sheaths and the common flexor sheaths. The former are concerned with the finger distribution as distinct from the palmar. They extend from the bases of the terminal phalanges to the level of the distal transverse crease of the palm opposite the necks of the metacarpal bones, except those in relation to the little finger and the thumb. That of the little finger is continuous from the base of the first phalanx to the common flexor sheath, into which it opens, that of the thumb maintains an independent course from the base of the first phalanx to a point about one inch above the transverse carpal ligament, though it is true that it frequently has a communication with the common flexor sheath (Fig. 4). Each sheath or theca is composed of strong fibrous tissue arranged transversely across the long axis of the finger and attached to the lateral and medial borders of the phalanges and to the interphalangeal and metacarpo-phalangeal ligaments. Opposite the joints (interphalangeal and metacarpo-phalangeal) the transverse arrangement of the fibres is replaced by a decussating one, no doubt to permit greater facility of movement, blood-vessels perforate the decussation and—of peculiar importance—the cutaneous tissues

of the creases at the distal and mid-interphalangeal joint comes into close relationship with the sheath,

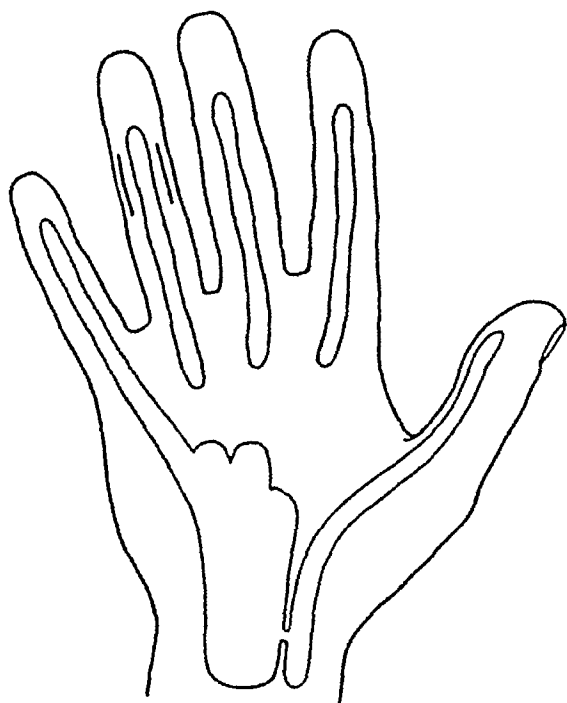


FIG. 4.—Tendon sheaths of the hands, showing lines of incision in thecal suppuration

owing to there being virtually no subcutaneous fat at this point. In other words, if it is desirable to puncture the theca it can be done most easily by inserting the needle through the centre of one of the interphalangeal creases. It is unnecessary to insist upon the practical importance of this consideration.

The common flexor sheath lies beneath the transverse carpal ligament, it extends proximally into the forearm for a distance of about  $1\frac{1}{2}$  inches above the ligament, and it passes distally to the middle of the palm. The contact surfaces of both sheaths and tendons are lined by mesothelial cells, and the space which exists contains a trace of fluid derived from the mesothelial surfaces.

*The clinical considerations*—Infections of the tendon

or its sheath may arise in various ways, the most important of which are puncture wounds of the palmar aspect of the finger and extension of infection from the finger pulp. In regard to the former possibility reference has already been made to the structural arrangements which render infection of the tendon sheath so likely when the puncture is situated at the crease. The infecting organism is almost invariably the streptococcus, and this is so constant in this situation that it suggests that the streptococcus may have some specificity for attacking mesothelial tissue of this type. The clinical features of a tendon sheath infection are characteristic: there may be considerable general illness, the tongue is coated, the temperature is raised, and the pulse-rate increased. But what of the local changes? Note the position of the affected finger—it is held slightly flexed at the metacarpo-phalangeal joint, the other joints of the finger are held rigid and extended. An attempt to straighten the finger at its point of flexion at once induces an increase of pain. Observe also that the finger is swollen, mainly on the palmar surface, though there is also some cedema apparent posteriorly. A blunt point gently pressed upon the tendon line induces acute pain. This combination of features indicates an infection of the theca, and its associated tendon, and of the various signs the attitude of the finger and the pain induced by extension are probably the most significant.

*Treatment.*—Hitherto I have indicated the importance of delaying incision until we are satisfied that the infection is localizing and suppuration developing. The same principle applies in relation to tendon infection, but I would add that the need for incision and drainage arises earlier in the case of tendon infection than in the other conditions we have considered. There is the further point that undue delay in this situation is particularly harmful, because it may imply a sacrifice of the functional value or even of the life

of the tendon, while infection may extend into other and more serious areas. When the time for drainage has arrived the operation entailed should be carried out through a bloodless field, and therefore a tourniquet in the form of an Esmarch's bandage, or, as some prefer, a blood-pressure armlet, is used. The incision will extend along the finger edge—whether radial or ulnar is immaterial—and it will lie anterior to the digital vessels and nerves. The incision should, if possible, avoid the creases; on the other hand, it must be so designed that full drainage is secured, and if necessary there need be no hesitation in prolonging the incision into the palm. Drainage is maintained by passing portions of rubber dam down to the opening in the theca; the drains should not enter the sheath, for, if they do, adhesions between tendon and sheath are likely to occur. Having secured drainage, we give our attention to the problem of after-treatment, a matter of supreme significance if the best functional result is to be secured. One of the most important details is to maintain a rigid asepsis. The original infection is most likely streptococcal, and it is imperative that no other type of organism shall be allowed to enter, for, if such should occur, it is certain that the infection will follow more serious lines, both in intensity and extent. For this reason I prefer to adopt a dry aseptic technique in the after-treatment of tendon infection rather than the intermittent bath or the irrigation technique. If it should be impossible to secure the aseptic ideal, an antiseptic bath (sanitas, eusol, or iodine) will be adopted. As soon as the relief of pain permits it, finger movement should be encouraged, and as convalescence proceeds a light splint is fitted to afford the comfort of support. Massage is started as early as the condition of the wound permits.

#### INFECTIONS OF THE HAND SPACES

Lying deeply in the palm of the hand beneath the



marked tenderness Pain could also be induced by more indirect means, by extending the flexor fingers, no doubt because such a manoeuvre increases the tension within the palmar space

*The sequelæ of untreated space infections*—In the case of the thenar space the infection tends to make its way either towards the web between the thumb and the forefinger or towards the base of the index finger, eventually pointing in the web between index and middle fingers or more rarely invading the tendon sheath of the index finger. Mid-palmar space infection may appear superficially at the webs between the middle, ring and little fingers (Kanavel), but more frequently the suppuration extends centrally to invade the space which lies ventral to the pronator quadratus beneath the deep flexor tendon, thence extending into the forearm.

*The treatment of hand-space infections.*—It may be stated as the general rule that when a hand-space infection is sufficiently definite to be recognized as such the time has arrived when incision and drainage should be employed It is proper, however, that in the early stages of the infection treatment should follow the conservative lines which have already been discussed in relation to infections in other parts of the hand and fingers, but the hand incision must not be delayed unduly in case the pus should make its way into areas such as the forearm, where serious damage to highly-important structures may ensue

*Incision for drainage of the thenar space.*—We have found that an appropriate incision through which the thenar space may be entered is one which runs in the web between the thumb and the forefinger (Fig. 5). It must not extend on to the forefinger in case the radialis indicis artery be damaged, and it therefore should occupy the middle third of the web. The position of the princeps pollicis artery is such that it is most unlikely to suffer damage. Through the incision a dressing or sinus forceps is passed so that it is carried parallel to the axis of the metacarpal bone of the

thumb for a distance of about 4 cm, the track being superficial to the adductor group and deep to the abductor and flexor brevis. Drainage is secured by means of a strip of soft dental rubber. If for any reason insufficient drainage seems to result, an additional point of entry is made by an incision across the long axis of the web between the index and mid fingers. The incision is carried towards the palm for a distance of 2.5 to 3 cm (Figs 5 and 6), and a dressing forceps passed through it, but carried in a slightly radial direction, enters the thenar space.

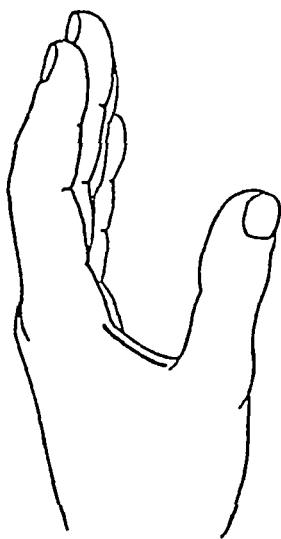


FIG 5—Incision for thenar space infection

*Incision for drainage of the mid-palmar space*—Drainage of the mid-palmar space is secured by incision at right angles to the webs between the little, ring, and mid fingers, and occasionally between mid and index fingers. The incisions should extend for some distance into the palm, but they must not extend up to the level of the mid-palmar crease in case of damage to the superficial palmar arch. The exploring forceps are passed parallel to the adjacent metacarpal bone except between the index and middle fingers; in this instance the forceps should cross the metacarpal bone of the mid finger obliquely towards its ulnar side. Drainage is secured in the usual way by strips of dental rubber (Fig 6).

*The after-treatment of hand-space infections* is conducted on the lines indicated in relation to tendon infection, and, as in that instance, our choice is in favour of a dry aseptic technique in preference to wet dressings and antiseptic baths.

*Some details of after-treatment*—The following points

include the more important essentials:—(a) Observe the most scrupulous care in the aseptic or antiseptic

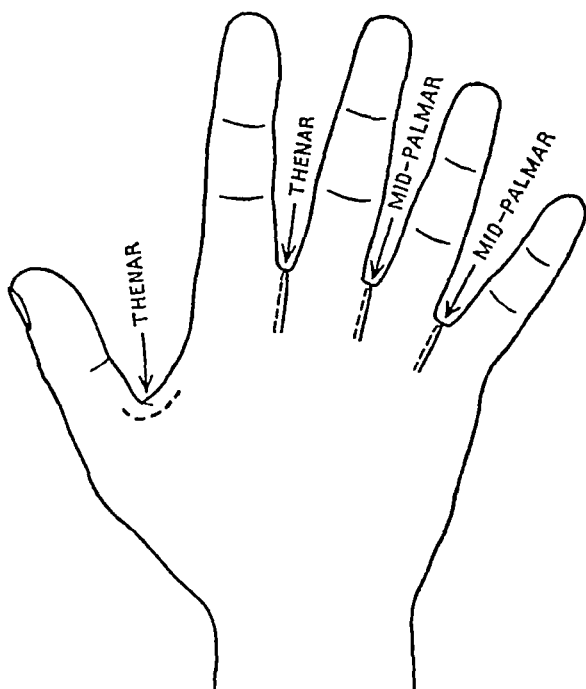


FIG. 6—Incisions for thenar and mid-palmar space infections

technique which the wound demands; (b) encourage active movements of the various joints from the moment treatment is begun, (c) as soon as the state of the wound permits it, institute massage and passive movements of the parts; (d) when the acute stage has subsided and the amount of dressing is relatively small, a splint may be applied in order to prevent acquired deformity.

These are some of the considerations of a group of surgical affections the importance of which it is difficult to exaggerate. It is true that we are sometimes inclined to consider hand infections as trivial in their significance, and that this is shown by their inclusion under the category of minor surgery. When we appreciate how serious are the disasters which may follow in their train we realize our responsibilities.

# The Treatment of Pleurisy

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PLEURISY is a very definite pathological condition, though it should not be regarded as a clearly defined clinical entity, in spite of the fact that the term is often employed and accepted as a diagnosis. The reason for this is, that though pleurisy is rarely primary, being as a rule secondary to some more widespread or deeper disease or infection, yet it produces a definite group of symptoms, which often overshadows and sometimes conceals the primary condition, indeed the subjective manifestations are not infrequently so positive and painful that they compel immediate treatment. A diagnosis of pleurisy should not be regarded as sufficient without some qualification, indicating the cause or origin of the inflammatory condition of the pleura. There is a further reason for making the diagnosis of pleurisy more explicit. A history of pleurisy in a proposer for life assurance, especially if he be of light build, or have a definite family history of tuberculosis, may act prejudicially on his acceptance, unless the nature of the pleurisy is definitely stated. The main reason, however, for the most careful investigation into the causation of every case of pleurisy is the importance of treating the primary condition underlying the inflamed pleura, in addition to giving relief to the painful symptoms. Failure to do this sometimes leads to serious consequences, notably to the development of serous effusions and active tuberculosis, to unrecognized or neglected empyema, or to delay in treating effectively atypical cases of true pneumonia.

*Classification* —The most convenient classification is

partly clinical and partly pathological.—

- Acute :* (1) Dry Pleurisy.  
(2) Pleurisy with effusion.  
(a) Serous.  
(b) Sero-purulent.  
(c) Purulent.  
(d) Hæmorrhagic

- Chronic :* (1) Chronic dry pleurisy.  
(2) Chronic effusions.  
(3) Chronic adhesive pleurisy.

*Treatment.*—It should, however, be recognized that, though useful, especially from the point of view of treatment, this classification is artificial, since most of these conditions are stages in a process of varying degrees of intensity, extent and virulence, so that the condition may cease at the dry stage, that is when there is little inflammatory effusion, only sufficient to form the false membrane, or exudate on the inflamed serous surfaces, or it may proceed to the pouring out of a large quantity of clear serous fluid of inflammatory character or to turbid sero-purulent fluid and eventually to definite pus, either at once or late in the course of the case, depending upon the nature of the organism and the degree of its virulence. The treatment of pleurisy must therefore depend upon the cause, the stage, the intensity, and the extent of the process.

#### DRY PLEURISY

The pain of pleurisy, especially when it affects the lower part of the pleura, is very severe, and when it involves the diaphragm it is usually excruciating. A diagnosis can be made with certainty if definite friction is heard, but friction is usually inaudible in diaphragmatic pleurisy and sometimes it is very difficult to distinguish superficial, intra-pulmonary râles from fine crepitant friction. It is curious in this connection that there may be little or no pain with coarse, grating friction, so rough that the patient may

be conscious of a rub, or even hear it, while a fine superficial crepitant friction may be associated with intense pain.

The diagnosis of dry pleurisy, from pain arising in or referred to the thoracic wall, such as the conditions comprised under pleurodynia, including fibrositis, myalgia and intercostal neuralgia, is often difficult, the more so that in the first of these conditions superficial creaking sounds may be heard. These can usually be distinguished, since they are not related to the respiratory movements and are easily produced by movement of the scapula.

The causes of acute dry pleurisy are pneumonia, tuberculosis, septicæmia, rheumatism, new growths, especially malignant forms, and extension from disease of adjacent structures, e.g. the lung, the pericardium, the mediastinal contents, including the bronchial glands, and from sub-diaphragmatic conditions. It often results from injury such as fracture of the ribs.

Every case with thoracic pain should be treated seriously, particularly if it be associated with cough and fever. A diagnosis of pleurodynia should not be made until pleurisy has been excluded. The patient should go to bed and keep to a light diet while the necessary investigations are being made. If fever be present, the nursing should be as for a case of pneumonia, the room being well ventilated and kept at a temperature of 60-65° F. Since breathing is usually very painful, the patient should be in the position found to be most comfortable. This may be lying flat on the back, so as to hinder diaphragmatic breathing and favour shallow upper costal respiration, or the patient may find most ease by lying on the sound side at first, thus avoiding pressing the inflamed surfaces together. Later, lying on the affected side may be more comfortable by limiting the movement of the lung on that side.

The two symptoms which call for treatment are pain

and cough. Pain may come on suddenly and may be of such severity as to produce shock or collapse, particularly when the causal condition is pneumonia, or where the diaphragm is involved. It is usual to try local treatment for the pain in the first instance, e.g. hot applications, poultices, antiphlogistine or turpentine stupes are much favoured. Painting with tincture of iodine (the mild form) or the application of liniments like *linimentum terebinthinæ aceticum*, or liniment A.B.C. (aconite, belladonna and chloroform) is sometimes employed. A useful application is menthol, dissolved in an ounce of chloroform liniment, in the proportion of one or two drachms to the ounce, sprinkled on warmed lint, bound or strapped over the painful area. Dry cupping is sometimes employed. As in other painful conditions, the application of leeches or flying blisters may give great relief. Strapping the chest wall is sometimes employed, though not as frequently as formerly, except in cases associated with broken ribs. In other cases, if strapping is employed, it should be removed after a day or two, to allow of examination and to permit the lung to expand.

In many cases all such measures fail to give relief to the pain, especially when it is aggravated by the short dry cough, so commonly present. It may then be necessary to give some strong sedative to relieve the pain and to lull the respiratory centre. In very severe cases it is best to give an injection of morphine at once. There is an old prejudice against giving morphine to patients with pneumonia. There can be little or no objection to its use in the early stages, before there is much expectoration. Caution is necessary in the later stages, when the respiratory centre is becoming insensitive. In many cases, heroin or codeine may suffice, either as an injection or as a linctus. After the acute pain has been lessened, pyramidon, aspirin, cibalgin or other analgesic powders

or preparations may be useful.

In very severe cases, when other measures fail, the introduction of air into the pleura by an artificial pneumothorax apparatus, in quantities sufficient to separate the inflamed surfaces, has been recommended. Recently this method has been employed even in cases with pneumonia, as a primary means of treatment. Further treatment in cases of dry pleurisy must be adapted to the underlying or causal condition.

#### PLEURISY WITH EFFUSION

Although the dry stage of most cases of pleurisy with effusion is associated with pain and cough, these may be slight and they are often ignored by the patient, so that the practitioner is sometimes only consulted when severe malaise, fever and dyspnoea urge the need of advice and when physical examination may show unequivocal indications of fluid in one or both pleural cavities.

On the other hand, a case starting with acute pain and cough during the dry stage, may with the development of fluid, show a notable amelioration, which may be misleading, unless the temperature and the physical signs are carefully watched. In other cases, especially when the outpouring of fluid is rapid, or in those progressing to pus formation, there is rise of temperature increasing daily, with sweating, cyanosis and more and more dyspnoea.

The treatment in cases with fluid in the pleura, until the nature and extent of the fluid are established, is practically that for any severe infection, namely, rest in bed, careful nursing, milk diet and treatment of symptoms. All clinical means of investigation should be employed—including examination of the sputum, a blood count to reveal leucocytosis as an evidence of pus formation and, where possible, X-ray examination. Exploratory puncture is desirable in most cases and should be carried out with the same



Burrell's siphon apparatus and the three-way Rotunda syringe are simple and effective, both enabling the aspiration to be carried out single-handed. In paracentesis, unless it is done by the method of air-replacement, no attempt should be made to withdraw all the fluid, and the tapping should be stopped when cough, pain or distress supervenes.

In cases where absorption is slow, or where there is much pain, local measures of counter-irritation, similar to those detailed under the treatment of dry pleurisy, may be employed, notably such measures as cupping, blistering, or the use of leeches.

After the fluid has absorbed, convalescence may be rapid, but the lung on the affected side may be slow to expand. In every case, where the tuberculous nature of the case is established, or even if it be highly probable, the patient should be advised to spend at least three months under open-air conditions, or even in a sanatorium. When this advice is neglected, there is a strong probability of the development of active lung disease within five years. When the affected side is slow to expand, exercises to promote full re-expansion may be employed, provided there is no evidence of definite lung involvement. This may be done by blowing water from one Wolff's bottle to another or by special exercises. A simple one is for the patient to sit sideways in a chair, the sound side being against the back of the chair, with the arm over the back rail, holding on to one leg of the chair, so as to impede the movement of the sound side. Deep breaths are then taken with the result that there is increased expansion of the affected side.

*Sero-purulent and purulent effusions (pyothorax and empyema)* —Sero-purulent and purulent effusions most commonly result from pneumonia, when they may occur during its course (syn-pneumonic) or as a sequel (meta-pneumonic), or as a result of local or general pyogenic infection, generally streptococcal. They may,

however, occur after pulmonary embolism, after injury or from disease below the diaphragm. Empyema also occurs as a complication of acute specific fevers, especially influenza, variola and enteric fever. Localized collections of pus may form in unusual situations. Interlobar empyema is more common than is generally recognized. Mediastinal and apical empyemata occur but are less common, in empyema in unusual or anomalous situations, the possibility of malignant growth as a cause should always be remembered and, if possible, complete radiological investigation should be carried out.

The treatment of empyema is still too often the subject of misconceptions and of ill-timed or wrongly-chosen interference. The report of the American Empyema Commission,<sup>1</sup> which is a medical and surgical classic, is still not sufficiently known in this country. It deserves the most careful study. When empyema is suspected on clinical grounds, or when it has been established by blood count or by exploratory puncture, the character of the fluid removed should be most carefully studied. If the fluid is definitely opaque, thick pus and—especially if pneumococci are established as the causal organism—rib resection and effective drainage are usually indicated. If, on the other hand, the fluid is thin, sero-purulent, and especially if streptococci prove to be the infecting agent, operation should on no account be performed. The fluid should be aspirated and the aspiration should be repeated when necessary, generally every second or third day, until the fluid withdrawn is definite opaque pus. Then, and not till then, should operation be performed. Before this occurs, two, three or more aspirations may be necessary.

The reason for these rules has been established by the American Empyema Commission. The presence of pus in the pleura must not by itself be regarded as indicating a localized collection, comparable to an abscess, which

occur in tuberculosis. These are sometimes helped by paracentesis and washing out with some antiseptic solution like mercurochrome or weak methylene blue. On the other hand, if not too large they may be left alone, since gradual absorption with re-expansion of the lung may occur.

*Chronic or neglected empyema* is a difficult problem, often requiring long and very carefully devised surgical treatment, to secure re-expansion of the lung or falling-in of the chest wall.

*Chronic adhesive pleurisy* or pleural adhesion and thickening is a common result of pleural inflammation, whether due to tuberculosis, pneumonia or empyema. The chief symptom is a dragging or aching pain, often worse in wet weather and sometimes apparent on effort or on violent movement of the arm and shoulder girdle. It does not as a rule require treatment; if severe, analgesic applications or diathermy may be employed. Exercises may also be helpful.

#### Reference

<sup>1</sup> *Journ Am Med Assoc.* 1919, lxxi, 366, 443.

# Seasonal Hay Fever

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THERE still appears to be a certain amount of uncertainty as to exactly what clinical conditions are to be included under the term hay fever. But in view of the clear implication in this title that the disease is connected with plant life and its active spring and early summer growth, there is much to be said for confining it to the seasonal type of disease alone. Non-seasonal spasmodic rhinorrhœa, although it may be clinically almost identical during the actual attacks with the seasonal type, can be shown, in different individuals, to be due to hyper-sensitivity to a great variety of allergens, in fact, to any of those capable of forming one of the causes of more immediately recognizable allergic states. The non-seasonal form has very little claim, indeed, to the definite name of hay fever. In this article we have confined ourselves to the seasonal type, although it may in passing be said that, save for the difference in the nature of the allergens concerned, many of the points raised, particularly the rhinological, apply equally well to the perennial or non-seasonal disease. Fortunately, in the pollen-produced hay fever, our search for sensitizing agents is narrowed down to reasonable limits.

Given, however, a definite seasonal occurrence, the diagnosis is not always obvious, especially among town-dwellers. Recurrent head colds and chronic sinus infections are too common to allow this. But

head colds generally run a relatively definite course, starting with burning sensations in the throat or nasopharynx. The initial nasal secretion is thin and irritating to the skin with which it comes in contact. Later it becomes frankly purulent. General involvement of pharynx, larynx, and bronchi, such as occurs in a cold, rarely appears in uncomplicated hay fever. A cold continues until it has run its course, an attack of hay fever may come and go in a few hours. The secretion in hay fever is usually clear and non-irritating throughout the attack. Fever and malaise are usually absent.

In the case of chronic sinus infection the position is not quite so well defined, because, as explained later, it is probable that recurrent hay fever may ultimately lead to chronic sinus infection, but most of the difficulties may be overcome if a really careful rhinological examination is made in each case. Interpretation of the observations then made may be easier if the following points are remembered.

In hay fever the reaction to the pollen protein is shared by the conjunctival, nasal and tracheo-bronchial mucous membrane. While the predominance of the nasal symptoms has undoubtedly led to undue stressing of the importance of minor nasal abnormalities, the study of the effects of hay fever on the nose has thrown light on many chronic nasal disorders. Attacks of sneezing, frequently prolonged, accompanied by watery or mucoid discharge, headache and nasal obstruction are common to all vasomotor disturbances of the nose. They may be confused with the onset of acute infections or with local reflex irritations, but the characteristic bluish-grey pallor of the mucosa in hay fever is readily distinguished from the redness of acute infections. Moreover, the oedema does not shrink readily with cocaine and adrenaline.

Pioetz has shown by radiological examination that the lining membrane of the sinuses is also affected by

a transitory œdema and may swell to ten times its normal thickness, returning later to normal. Thus the headache so frequently observed during attacks of seasonal vasomotor rhinitis can be ascribed to obstruction of the ostia of the sinuses. Moreover, repeated œdema may lead to permanent hyperplasia of the lining membrane and to the production of polypi within the sinuses. Owing to the loss of ciliated epithelium and to obstruction of the ostia, sinuses so affected tend to become invaded by bacteria. The underlying allergic condition may then be masked by the secondary sinus suppuration. Local manifestations in the ears, such as tinnitus and vertigo, are occasionally present. Pharyngeal irritation is common and helps to distinguish vasomotor rhinitis from local reflex nasal disturbances in which it is absent.

Rhinological opinion is sharply divided on the question of the importance of the nasal factor in the group of diseases represented by hay fever, asthma, and chronic vasomotor rhinitis.

An increasing body of opinion favours the view that sinusitis, when present in these conditions, is purely a secondary effect of the hypersensitiveness and repeated attacks of œdema, and bears no causal relationship to it. Others regard pathological conditions of the mucous membrane and sinuses as important predisposing factors to the development of hypersensitiveness.

Certainly it is obvious that a nose already obstructed by a badly deflected septum or by the congestion of chronic infection will withstand the œdema of hay fever with more difficulty than a normal nose, and that a chronic irritation from infection may increase the local reaction and prevent successful de-sensitization.

When we come to consider the actual allergens at work in this disease, it is interesting to recall that the idea that hay was the essential cause of this condition originated early last century, and the term *hay fever*

came to be used among the laity in days when the word fever was used to denote almost any indisposition. At the present time, however, it might be well, as advocated by several recent writers, to substitute the name *pollen-allergy*, for it is becoming increasingly clear that symptoms arise only in individuals particularly sensitive to contact with certain pollens, and that these do not necessarily come from grasses. The most important of the pollens are usually conveyed from the anthers of the flower to the stigma of the pistil by external agencies, particularly wind. Insect pollination has been observed in a few species of allergy-producing plants, but these all belong to those types with which, in the home, workshop or field, the patient is liable to come into very close contact. The wind-pollinated plants produce during their own particular seasons a series of pollen clouds, grains from which invade the upper respiratory tracts of all individuals in the district. Only the hypersensitive develop symptoms. In England the pollen cloud is most marked from the middle of May to the latter part of July, the season becoming a little later as we go northward.

When considering the conditions prevailing in any particular district, it must be remembered that weather has a marked influence upon the concentration of pollen in the air. Rain, for example, early in the year produces vigorous plant growth and therefore much pollen, whereas rain during the pollen season, especially slow rain and humid conditions, may effectively clear the air of pollen.

Wind affects pollen clouds in various ways. Since pollination is most marked early in the morning, wind at that time picks up much pollen. Upon the speed of the wind and its direction depend respectively the distance to which the pollen is carried and the districts mainly affected by the pollen cloud. Thus the nature of the prevailing wind directly influences the

distribution of hay fever in districts with localized areas of plant growth.

The height to which the pollen may ascend varies considerably. Usually pollen is abundant at 4,000 ft.; above this level the cloud slowly loses its intensity. But it must be remembered that pollen frequently travels in the form of localized clouds, the elevation of which changes with the air currents, so that the onset of hay fever attacks may coincide with some sudden temperature or weather changes causing the clouds to descend.

The more pollen that comes into contact with the sensitive person, the more severe will the symptoms be, so that windy weather and rapid movement, such as motor travel, are specially unfavourable, and calm, settled weather generally best for hay fever patients.

Now, as to the contents of the pollen, it will be well to recall some of the more recent work upon the nature of the substances to which the patients are hypersensitive. The original conception was that the sensitizing substances in pollen must be proteins. But it has been clearly shown that pollens can be submitted to processes sufficiently disruptive to leave residues entirely free from anything giving the chemical reactions of protein, and that these residues possess undiminished power of producing reactions in the patients. Coca, Black, and others have already brought forward good evidence that the offending substances are complex carbohydrates.

From the clinical standpoint it is of more practical importance to make note of the types of pollen containing these sensitizing substances which can be found in this country. The possibly causative varieties have a very specialized distribution among the different continents, a fact which must be remembered when we are seeking to advise patients as to localities most likely to suit them, endeavouring to identify the plant which causes their trouble or employing, during



cutaneous testing, pollen extracts not manufactured in this country.

In the United States of America so complete a survey of the prevailing distribution of the different types of pollen has been made that it is possible there to advise a patient with reasonable certainty as to which districts will be best for him. Unfortunately, we have no such accurate records in the British Isles, but Bray has compiled a most valuable illustrated list of all our plants and trees which give rise to sensitizing pollens together with the dates at which they liberate it.

It is a point of clinical importance, however, that with us the pollen of trees is a much less frequent cause of hay fever than that of grasses. Trees have a limited distribution and they pollinate over much shorter periods. Nevertheless, tree pollen must always be considered when we are dealing with woodland districts or heavily-treed town streets. There are extremely few British wind-pollinated weeds which can cause hay fever. Flowers, like cereals, have large sticky pollen grains, which are usually insect-carried and unable to affect any but those very closely associated with them. Strictly speaking, among the grass pollens we must include those of the cereals, but these plants produce large, heavy pollen grains which are not easily air-borne.

When investigating a case of hay fever in this country we have thus every justification for concentrating first upon the pollens of meadow grasses, unless the patient's history gives definite indications to search elsewhere. Besides making cutaneous tests with the usual pollen extracts, we may often obtain much useful information by making atmospheric pollen plates in the district where the patient lives or where he has his worst attacks. The plate consists of an ordinary microscope slide, the centre of which has been covered by a thin, even layer of glycerin. Exposed to the air,

these plates collect the pollen grains falling upon them, and light staining with iodine, followed by microscopical examination, will at once show the nature and relative prevalence of the pollens with which the patient habitually comes into contact. Valuable guidance can thus be obtained in our choice of pollens when making the cutaneous tests. Details of the actual performance of these tests will not be given here, because this information is fully provided with most of the pollen extracts now on the market. It will be better at once to consider the possible methods of procedure once hyper-sensitization to any particular pollens has been proved.

Before any form of de-sensitization is attempted it is clearly most important to be certain that no chronically infected foci or remediable structural abnormalities exist in the upper respiratory tracts. This aspect of treatment is considered in our concluding paragraphs. One must also make sure that the patients are not sensitive to any allergens other than pollens with which they may frequently come into contact. Dust and animal emanations are particularly important in this respect. Failure to notice multiple sensitization is a not infrequent cause of failure in treating these cases. Consequently, although extracts of the majority of substances to which a patient is likely to be sensitive are now upon the market, it may occasionally happen that suspicion may fall upon some particular material or the dust from the patient's home, from which the laboratory can easily prepare mildly alkaline, filtered, bacteria-free extracts. In some cases of hay fever, as of asthma, it may greatly increase the efficiency of subsequent de-sensitization if, the patient's history or circumstances having given the necessary clue, substances other than pollens are included in the cutaneous tests, and if proved to cause reaction, included in the de-sensitizing mixture subsequently used.

Speaking generally, the most rational procedure for

relieving the patient is specific avoidance of the offending pollen. But in hay fever this is rarely practicable, except in a very minor degree, and although it is undoubtedly true that allergen-free chambers or the elaborate methods of removing pollen from the air ventilating a patient's house, may help sufferers from pollen sensitization, yet the expense and limitation of movement involved are obvious disadvantages. De-sensitization, therefore, still appears to offer the best hope for the majority. The methods adopted differ according to whether treatment is to be given prophylactically, i.e. before the pollen season begins, or after the onset of symptoms, when the pollen cloud has appeared. The latter is certainly the most difficult and least efficacious. In 1930 Freeman published his method of "rush inoculation" for use in cases met with during the pollen season, and this appears to be a definite improvement upon earlier schemes. Extract of the specifically reacting pollens is injected subcutaneously every  $1\frac{1}{2}$  or 2 hours throughout a fourteen-hour day, and in this way it is found that de-sensitization may often be achieved in 2 to 4 days. The dosage must be regulated by the degree of sensitization originally noted in the patient, and is generally decidedly lower than that adopted in the prophylactic methods next to be described.

When circumstances permit, the method of choice is, however, prophylactic or pre-seasonal de-sensitization, which consists of a series of administrations of the extract, ending just before the pollen season starts. It has been claimed that a certain amount of protection may be obtained by taking pollen extracts by the mouth, and that sprays and local applications of extracts to the nasal mucous membrane will produce moderate de-sensitization, but the published records appear definitely to favour the results of inoculation by the intra- or sub-cutaneous routes.

An important question arises, however, in deciding

the type of pollen extract to be used. As already explained, specific sensitization can be demonstrated with pollen when it has been so far broken down that no demonstrable protein remains. There is therefore probably little difference in potency between the various makes of extract on the market. But the question of the exact type of pollen is not so easily dismissed. With the tree pollens it appears to be essential to use extracts of the particular pollen which cutaneous tests have shown to be affecting the patient. In practice, however, tree pollen sensitization appears to be so rare in this country that prophylaxis is seldom required, especially as the tree pollen season is so short. In the British Isles we are mainly concerned with the grasses. At one time it was thought de-sensitization against Timothy grass pollen would provide protection against all the English grasses, but recent experiment appears clearly to show that, although pollens which are biologically related have a certain amount of antigenic substance common to all, yet most have varying amounts of secondary antigen peculiar to themselves. Therefore, although some protection may be obtained by using Timothy grass extract, better results may justifiably be expected if an extract is built up combining all the pollens to which the patient is sensitive.

As regards actual technique in de-sensitization that described by Bray appears to be one of the most rational and likely to give good results. Having accurately determined the patient's skin reactions towards the pollens and any other allergens with which he is likely to come in contact, the laboratory can be asked to prepare a concentrated, mixed extract in a rubber-capped bottle. From this 1 c cm. is transferred to another similar bottle, together with 9 c cm. of carbol-saline, thus making a 1 in 10 dilution. From this 1 c cm. of the dilution and 9 c cm. carbol-saline are placed in a third bottle, and so on. In this way a

ment should be considered only when definite rhinological indications are present. Although the nasal effects of the hyper-sensitive state may at times require surgical treatment, care should be taken (*a*) to distinguish them from primary nasal disease, and (*b*) to see that whatever local measures are required, de-sensitization treatment is also attempted. With these safeguards the rhinologist's aim should be to obtain an efficient airway in a nose free from chronic bacterial infection.

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# Indigestion

By S W PATTERSON, M D , D Sc , M R C P

*Physician to Ruthin Castle*

THOUGH most of us know what we mean by indigestion, it is not easy to define it. It really connotes want of digestion or incapability of digesting food, but it is used generally in a more limited sense to mean difficulty in digesting food. The word dyspepsia is often employed, especially when gastric digestion is interfered with. It is included in this paper, which will attempt to discuss the management of patients complaining of discomfort (arising in the digestive organs) associated with the process of digestion.

Normally we are unconscious of the phenomena of digestion, except for the rather pleasant sensations of eating with appetite, of comfort after a meal and the call for defæcation. It is only in morbid conditions that the digestive functions obtrude themselves into consciousness in adult life. In the young infant it seems to be otherwise; stimuli from the internal organs appear to dominate those from outside and the processes of digestion even in the healthy baby seem to be accompanied by sensations which readily become painful ("wind"). With the development of the child these internal sensations rise less and less into consciousness, and the healthy adult ignores wind of an ordinary amount. The digestive organs are insensitive to heat, cold and light touch, but pressure from contact may excite painful sensations in the presence of inflammation of subjacent organs; for example, pain and tenderness are present when the peritoneum is involved in the "acute abdomen". Sensations from the hollow viscera are associated with changes in the tension of the muscular layer of the wall of the viscus, either from spasm or distension. Most people have felt the

ment should be considered only when definite rhinological indications are present. Although the nasal effects of the hyper-sensitive state may at times require surgical treatment, care should be taken (*a*) to distinguish them from primary nasal disease, and (*b*) to see that whatever local measures are required, de-sensitization treatment is also attempted. With these safeguards the rhinologist's aim should be to obtain an efficient airway in a nose free from chronic bacterial infection.

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water at the end of the meal

*Tea* Bread or biscuit and butter, spongecake, weak tea and cream

*Dinner* As at lunch with addition of vegetable or milk soup, boiled or steamed fish with plain sauce

*Or supper* Fish, cold meat or an egg, with toast and butter, followed by milk pudding

Two tablespoonfuls of olive oil may be taken half an hour before lunch and dinner. Alcohol and tobacco are not advisable. Of medicines alkalines are best and may be given after meals, or in some cases before meals when given as aluminium hydroxide (neutrolon, alocol). Belladonna is often useful. For the attacks bicarbonate of sodium or magnesium carbonate may be given, the cremor magnesiæ (B P C) is useful for the accompanying constipation as well. Gastric lavage will relieve an attack of hyperchlorhydria.

Discomfort on taking food, which passes off when the stomach is empty or is relieved by vomiting, occurs in conditions of subacidity, *chronic gastritis*, *cancer*, *anæmia*, and *after exhausting diseases*. The appetite is poor and the patient quickly feels full, digestion is delayed and diarrhœa may be troublesome. The indications are to rest, especially to lie down for an hour before meals, the food should be easily digested, simple, nourishing and nicely served, avoiding rich sauces, hot fats, twice-cooked meats and foods containing hard pieces. It may be necessary to start with albumen water, whey or barley water, which may be flavoured with orange juice and contain added glucose, or with partly-peptonized foods and the various milk foods, in small quantities every three hours during the day and in wakeful intervals at night. In the absence of organic disease of the stomach gastric lavage often gives a good start. A mixture containing 5 drops of tincture of nux vomica, 10 drops of dilute hydrochloric acid, 30 drops of glycerin with compound infusion of gentian to an ounce, may be used before meals, and 40 to 60 minims of dilute hydrochloric



acid in a tumbler of diluted fruit juice may be sipped with the meal when a more solid diet is introduced

A diet for a case of chronic gastritis may be chosen from the following :—

*Breakfast* Porridge, force, post toasties or puffed rice with cream, fresh fish (steamed or boiled), cold ham or eggs, varied, white toast, butter, marmalade jelly or honey, tea with milk or cream, or weak coffee and milk

*11 a m* Glass of milk, plain or citrated, Horlick's malted milk or cup of Benger's or Allenbury's food with biscuits or rusks

*Lunch or mid-day dinner* Minced beef without flavouring (except a little salt), tender fillet of beef, roast or boiled mutton or lamb, grilled or steamed chop, sweetbreads, calf's or sheep's head, brains, tripe, braised tongue, young rabbit or chicken, boiled or roast, as cream, or soufflé, potato—creamed or plain mashed, sieved green vegetables or whole cauliflower, young French beans, asparagus or a little sieved broad beans, milk, light steamed or bread-and-butter pudding, custard or junket, sieved fruit or baked apple, white toast, butter, cream

*Tea* White bread and butter, plain cake, biscuits or tea rusks, jelly or honey, tea with milk or cream

*Dinner* No soup, fish, boiled, steamed, scalloped or as cream or soufflé, meat as at lunch, potato and vegetables as at lunch, milk pudding, custard, junket, jelly, blancmange, caramel, vanilla, lemon, orange, prune, peach, apricot flavouring, rice, tapioca or sago cream, sieved fruit or baked apple, white toast, butter, cream

*Or supper* If tea be later and more solid, a light supper as on page 61, instead of dinner

*10 p m* Milk, Horlick's malted milk, Benger's or Allenbury's food, with biscuits or rusks

In cases of atonic dyspepsia without gastritis, and to tempt the appetite, sauces, relishes, and flavourings may be added to the various dishes. Alcohol is not usually advised. If prescribed, as in some atonic or in elderly patients, a sound light wine or well-diluted whisky is taken with lunch and dinner. Gentle exercise in the open air should be taken each day, short of fatigue. A change from home surroundings will often stimulate convalescence from influenza.

Similar discomfort may follow motor insufficiency of the stomach. Of this there are various grades depending on *atony of the stomach wall* or on *stenosis of the pylorus* from spasm, hypertrophy of the sphincteric

muscle, scarring of a pyloric ulcer or pyloric carcinoma. With dilatation of the stomach following pyloric stenosis the patient may be comfortable while the stomach is empty; gradually, as a balance of the food taken remains, distension and discomfort come on, to be relieved after a day or two by copious vomiting. With pyloric growth or infected gastric contents the vomit may be very offensive. In simple cases a dry diet with small frequent meals and fluids apart from meals, and gastric lavage to clean out the stomach of indigestible residues and debris will often be found successful. Various antiseptics are recommended; of these, sulphocarbolate of sodium, creosote and  $\beta$ -naphthol are useful. Strychnine may be given by mouth or subcutaneously, and faradism to the abdominal wall may help. In severe cases of pyloric narrowing from organic disease operation may prove necessary.

Discomfort which is like a weight or lump in the epigastrium, often accompanied by flatulence, occurs in *cholecystitis* and *gall-stones*. It may go through to the shoulder blades at the back. The discomfort tends to come in attacks, when it is increased by taking food, there is often a feeling of chilliness of the skin and "gooseflesh" in the attacks. Actual colic may occur and jaundice of some degree. Eggs and fat, because they contain cholesterol, a constituent of gall-stones, are often eliminated from the diet in gall-bladder disease. On the other hand, yolk of egg and fats stimulate contraction of the gall-bladder, and on this ground they may be allowed, in small amounts. Since most of these patients are overweight, a reduction diet is indicated, consisting of fish, meat, green vegetables and fruit, with small quantities of bread, scones, butter and cream. Pastry and rich dishes are better avoided. Salines containing magnesium, such as Epsom and Vichy salts, are useful, and hexamine, even in large doses when combined with alkali, as a gall-bladder antiseptic. Exorcism in the open air

should be encouraged.

Attacks of discomfort after worry, anxiety, hurried or irregular meals, rich fatty foods, fatigue and chill, with griping pain across the upper abdomen followed by loose motions, are due to *colitis*. Mucus may be passed in the stools in jelly, shreds or membranes. These patients do better by avoiding fatty foods, sausage, fried and made-up dishes. Powdered kaolin, sometimes combined with bismuth or charcoal, is useful, and the bowel may be calmed with castor oil, better taken as the following emulsion :—

R	Olei ricini	-	-	-	-	-	-	3i
	Mucil acac	-	-	-	-	-	-	3i
	Sod bicarb	-	-	-	-	-	-	grs x
	Syrup	-	-	-	-	-	-	3i
	Aq cinnam ad	-	-	-	-	-	-	3i

Sig One to three times a day

Discomfort, with irregularity of the bowels, occurs also in *diverticulitis* of the colon. The pain is situated usually in the left iliac fossa, where the inflamed and tender descending colon and sigmoid may be palpable. The diet should not contain any indigestible and hard residues; liquid paraffin should be given by the mouth and by rectal injection, and gentle intestinal douches with normal saline solution are useful.

*Nervous dyspepsia* (functional) occurs in many forms. Patients may have all the subjective sensations and most of the anomalies of secretion found in organic disease. Functional disorders do not run a definite course, but vary from time to time. As a rule the digestive symptoms are independent of the amount and form of food taken, the discomfort is more vague and diffuse than in organic disease, and the patient's nutrition is less liable to be upset. Diagnosis is made still more difficult when the patient with organic disease has in addition an obvious psychopathic tendency. Such cases call for the fullest investigation, for the inclination is to emphasize the neurasthenic aspect and diagnose a neurosis. Many cases of gastric

and duodenal ulcer have been labelled neurotic. Full clinical, chemical and X-ray examinations should be carried out before a diagnosis of nervous dyspepsia is made. A careful history, giving the patient time to talk himself out, saves time in the long run. Even when functional indigestion is diagnosed, it is a good thing to treat the patient more seriously than less, to start on a lower plane of diet and effort than seems to be required, and to build up gradually. Thus the patient is able to develop an immunity to his discomfort and eradicate his phobia. The personal influence of the physician in inspiring confidence is important, and isolation from home and friends and a rest-cure in a nursing home are often advisable. As well as attention to diet, exercise and habits, the general neurotic state of the patient must be kept in view, and treatment adopted to improve the general health. Massage, hydrotherapy, golf, riding, and psychotherapy are valuable. Of the medicines, bromides, luminal, arsenic and iron are most suitable. When progress is well established the patient should be encouraged to follow a carefully laid down plan with full instructions as to diet, rests, sleep and exercise for a convalescent period before returning to the duties of ordinary life. This gives a measure of confidence which will stand him in good stead when he returns to work.

#### ACUTE INDIGESTION

Two forms of acute indigestion occur. *Acute gastritis* of toxic origin from unsuitable or contaminated food, in which the patient has epigastric pain and tenderness, vomiting of the irritant material followed by scanty vomit of alkaline mucus which may be blood-stained from much retching, is treated by evacuating the stomach by lavage or taking quantities of weak sodium bicarbonate lotion, and fasting, followed by albumin water, barley water and jelly. Bismuth, with a little

tincture of opium added if necessary, is a useful drug. In a day or two light solids may be given and gradually a normal diet resumed in most cases. *Attacks of hypersecretion* ("bilious attacks") follow some indiscretion in diet or irregularity of meals, worry or bad temper. The patient has epigastric discomfort, flatulence, often with air-swallowing and noisy eructation, and vomits copiously a strongly acid material which, later, contains bile. Rest in bed, gastric lavage and alkalis are prescribed, and an enema if the bowels are constipated. Small doses of calomel followed by a saline will often calm the stomach and counteract constipation. Recurrent attacks should lead to inquiry into the patient's habits of food and work; examination may reveal gall-bladder or appendicular disease.

#### REFERRED INDIGESTION

The patient may complain of indigestion when the disorder arises in other systems than the digestive tract. To treat the symptom then will lead to no lasting benefit, and the underlying cause must be sought out and dealt with. There is hardly a single organ of the body, disease of which may not have repercussions on the digestion. Patients with heart disease, for instance, may refer their symptoms to indigestion. In these cases carminatives may be helpful, but the circulatory defect must be given appropriate treatment. *Cardiac pain*, especially of the form of angina minor, is commonly referred by the patient to indigestion, it may be misleading to the practitioner, too, since the discomfort is in the precordial region or epigastrium, is accompanied by flatulence, and recurs intermittently following exercise or effort especially after a meal. Examination of the blood-pressure and heart, and careful inquiry as to the <sup>cause</sup> of the attacks will help the diagnosis. One of the <sub>chief</sub> constant features of angina is its association with stress or fatigue, or with emotion. Gastric

troubles are more closely associated with taking food. In angina too the pain tends to radiate into the left arm. Patients with this complaint must have their exercise limited; rests after meals, even complete rest in bed for a time, may be indicated. The diet should be non-flatulent, with reduced starches, and fluids are often better taken after or apart from meals. Vasodilators are helpful if the blood-pressure is raised, such as iodides, trinitrin, or erythrol tetranitrate. Flatulence may be relieved by a few drops of oil of peppermint or cajuput on a lump of sugar, or by a teaspoonful of charcoal. A possible syphilitic basis should be looked for and treated if necessary. Patients with *congestive heart failure* often have indigestion, from liver engorgement and gastritis, and should be treated by rest in bed, five small meals of simple and attractive foods should be given, and fluids taken between meals. It is often very difficult to induce a patient to take a salt-free diet, and all the ingenuity of the nurse or dietitian will be needed to provide dishes that appeal to the patient. With improvement in the circulation the digestive symptoms become less troublesome, but often digitalis preparations by the mouth seem to upset the stomach, they may be tried in pill form, as Nativelle's granules, or by subcutaneous injection of digitalin or strophanthin.

Early tuberculosis of the lungs or other parts of the body often causes dyspepsia, with lack of appetite and loss of weight. Observation of the morning and evening temperature, careful examination with the stethoscope and radiographic screen and diagnosis. In this type of case, as with indigestion accompanying inanition from a cancerous growth outside the alimentary tract, anaemia and recovery from exhausting diseases, such as the influenza which was prevalent last winter, the indications for dieting are to give small frequent meals of readily digested and appetizing foods. The patient should avoid fatigue, resting in

# Constipation and Mechanical Laxatives

By F B PARSONS, M A , M D , M R C P

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THE increasing employment of bland physiologically-acting substances in the treatment of chronic constipation, to the exclusion of mineral and vegetable drugs which produce their effect by increasing the force and rapidity of the normal peristaltic movements, has constituted one of the most radical changes in therapeutics during recent years. This is due to the fact that the action of these substances which may be conveniently termed "mechanical" laxatives, accentuates the normal physiological processes concerned in the propulsion of the intestinal contents through the alimentary canal and does not involve irritation or direct stimulation of the intestinal wall—effects which accompany the employment of certain mineral and vegetable drugs and which, too frequently, lead to the formation of habit. A number of mechanical laxatives are at the disposal of the prescriber and, as they vary considerably in their pharmacological properties, it is the purpose of the present communication to survey, from the experimental standpoint, those most commonly employed.

Mechanical laxatives may be divided into two groups:—(1) Those which act by softening the intestinal contents, thereby facilitating the propulsion of faecal matter through the intestine. With this group there is not any increase in the bulk of the intestinal contents and, therefore, no peristaltic reflex is invoked. Examples are . (a) liquid paraffin and other unsaponifiable hydrocarbon oils, and (b) olive oil, which must be administered in sufficient quantities to

allow of some free oil reaching the large intestine after it has been subjected to the action of the digestive juices.

(2) Certain hygroscopic substances which are administered in comparatively small volume and which, during their passage through the intestinal tract, absorb water and expand considerably. As a consequence, the bulk of the intestinal contents is greatly increased, and this stimulates the production of a peristaltic reflex. Examples of this group are psyllium seeds, agar-agar and bassorin, but the hygroscopic power of psyllium is so slight that it is difficult to believe that this property is solely responsible for the effects observed.

#### LIQUID PARAFFIN

Of substances which may be termed mechanical laxatives, liquid paraffin is the most important because it is, perhaps, the most commonly prescribed physical laxative, and also because the public consumes large quantities and often continues its daily use for years. It is interesting to remember that liquid paraffin was originally introduced into therapeutics as a substitute for cod-liver oil in the mistaken belief that it could be absorbed from the intestine and utilized as fat. The use of this oil as a remedy for chronic intestinal stasis was first suggested by Randolph in 1885,<sup>12</sup> but the writings of Lane, Hurst, Neville Wood, and others emphasized its value in the treatment of all types of chronic constipation and were largely responsible for popularizing its employment in this connection. It is particularly successful when constipation is characterized by hard faecal masses and when, as in the case of hæmorrhoids, it is desired to produce a well-lubricated motion. As the oil is without irritant action upon epithelial surfaces, including the intestine, it may be administered to infants and to those for whom for various reasons stronger laxatives are contra-



. indicated.

It is commonly stated that liquid paraffin is an ideal laxative because it is an unsaponifiable hydrocarbon oil which is indigestible and incapable of absorption. Recent observations, however, by Channon and Collinson,<sup>3</sup> indicate that liquid paraffin is absorbed from the intestine and is deposited in the liver. Post-mortem examinations of the livers of rats which had been fed for five weeks upon a diet containing 5 per cent. of liquid paraffin, and also of the liver of a pig which had been given 100 c cm. of the oil daily for 54 days, enabled them to conclude that, so far as these animals were concerned, liquid paraffin was absorbed from the intestine and was deposited in the liver in appreciable amounts. The total quantity absorbed must be small, for both Bradley and Gasser,<sup>2</sup> and Hutchison<sup>6</sup> were able to state that, except for doubtful traces, mineral oils were not absorbed by the intestine; and J. Mellanby,<sup>10</sup> during six hours' observation, was unable to detect absorption of liquid paraffin into the lymphatic system of the intestine. The importance of Channon and Collinson's observation, therefore, lies, not so much in the fact that liquid paraffin is absorbed from the intestine as in the possible effects which may result from its deposition in the liver.

Although liquid paraffin has been used for so long and so extensively in the treatment of constipation, there is still a lack of unanimity regarding its effects upon the digestion of food and upon absorption of the products of digestion. Mellanby<sup>10</sup> found that the oil inhibited absorption of bile from the intestine and, therefore, both the secretion of pancreatic juice and the further secretion of bile were diminished. In consequence of this observation he concluded that both digestion and absorption were retarded. Green<sup>4</sup> states that paraffin, being an indigestible insoluble hydrocarbon, must cause a thin film covering the absorptive mucous surfaces of the intestine, thereby interfering

directly with the digestion and absorption of food-stuffs; also it would similarly surround particles of food and interfere with the mechanical approach to them of the digestive juices. He quotes no experimental or clinical evidence in support of this opinion. On the other hand, Olson<sup>11</sup> reports a series of experiments which he carried out upon dogs, the results of which are not in harmony with the above opinions. He found that the digestion and absorption of protein, as judged by the faecal nitrogen-content, were not influenced by the oral administration of liquid paraffin, and he confirmed this result by observation upon a series of patients. He found, in addition, that paraffin had no effect upon the absorption of carbohydrates because the amount of reducing substance in the faeces remain unchanged after the oil had been added to the diet, and he, therefore, concluded that liquid paraffin, when taken by the mouth in therapeutic doses, had no influence upon the digestion and absorption of either protein or carbohydrate.

It is a simple matter to show that liquid paraffin will retard peptic digestion *in vitro*. If small pieces of fibrin, coloured with carmine, are placed in 5 c cm. of a 0.5 per cent. solution of pepsin, together with 5 c cm. of 0.4 per cent. hydrochloric acid, and incubated at 37° C, the fibrin is digested and the carmine liberated. At the same time, the dye colours the solution in the proportion to which digestion has occurred, and in one hour this assumes a deep red colour. When 1 c.cm. of liquid paraffin is added to such a mixture, digestion is markedly delayed, in four hours there is no apparent change, and in twelve hours the solution is only slightly tinged with carmine. Observation shows that the fragments of fibrin do not come directly into contact with the solution because they are coated with oil, and therefore they cannot be digested.

It does not necessarily follow that liquid paraffin retards peptic digestion *in vivo*, because there is no

delay in digestion if, in the above experiment, the liquid paraffin is emulsified before being added to the pepsin mixture. The emulsified oil is evenly distributed throughout the solution in the form of small globules and no protective film is formed on the surface of the fibrin. This indicates that, in practice, the effect of liquid paraffin upon peptic digestion can be modified either by administering the oil in an emulsified form or by administering foods rich in emulsifying agents, such as milk and eggs, immediately after the requisite dose.

The action of liquid paraffin upon tryptic digestion resembles the action upon peptic digestion; it prevents effectually access of the digesting fluid to egg-white, but this can be prevented if the paraffin is first emulsified. With lipase there is no effect; it does not inhibit, even in the slightest degree, the action of this ferment upon olive oil.

The conclusion to be drawn from the above experiments is that paraffin is capable of inhibiting the digestive action of the proteolytic ferments, but that this action is modified when the oil is emulsified. If liquid paraffin is advised as a laxative, there can be no doubt that it is better to prescribe it in an already emulsified form because the natural emulsifying power of the patient must vary to a considerable extent. Patients who complain of "seepage" or leakage of oil from the rectum whilst taking a small or moderate dose, are evidently incapable of providing the natural emulsifying agents, and this defect is also probably responsible for the loss of weight and digestive disturbances observed occasionally in those taking liquid paraffin.<sup>13</sup>

*The effect of liquid paraffin upon absorption from the small intestine*—It has been suggested<sup>4</sup> that paraffin forms a thin film covering the absorptive mucous surface of the intestine, thereby interfering with the absorption of foodstuffs. The following experiment,

however, indicates that this oil has no effect upon the absorption of glucose from the small intestine.—

A cat was anesthetized with urethane and four ligatures were tied round the small intestine in its distal part to form three isolated portions of gut each six inches long. 2 c cm of liquid paraffin were injected into the first loop through a fine needle and 1 c cm into the second loop, while the third loop was untouched. After half an hour—in order to allow the oil to spread over the mucosa—2 c cm of a 10 per cent aqueous solution of glucose = 0.2 gm of glucose were injected into each of the three loops. After an hour the contents of each portion were carefully examined quantitatively for glucose and the amount remaining in each case was identical, namely, 0.08 gm.

The conclusion to be drawn from this experiment is that liquid paraffin exercises no influence over the absorption of glucose from the small intestine of the cat, and there is no reason to doubt this statement in the case of man.

*The faeces* of patients taking liquid paraffin are usually soft, and they possess a greasy appearance, undoubtedly due to the presence of the oil. Under the microscope globules of oil which vary considerably in size can be seen, and careful search leads, not infrequently, to the discovery of globules containing striated muscle fibres. The presence of these striations denotes that the fibre has not been subjected adequately to the action of the digestive juices, evidently on account of the protective film of oil, and this fact supports the opinion expressed above, that liquid paraffin exercises a definite effect upon digestion.

#### EMULSIONS

In view of the experiments quoted above, which indicate that the effect of liquid paraffin upon digestion is dependent upon the degree of emulsification to which it is subjected, it is of interest to examine the composition and properties of those emulsions of liquid paraffin which are already in common use. A

will be found that agar absorbs 13 c.cm. of distilled water in 24 hours Klecker recently described<sup>7</sup> a

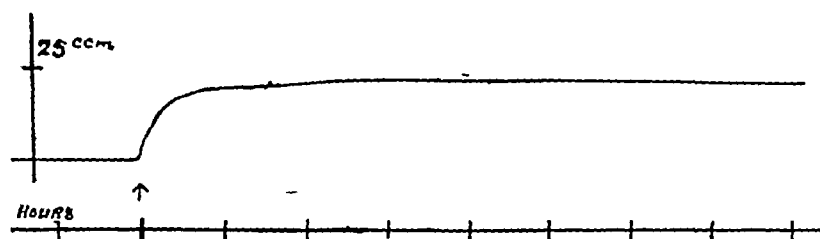


FIG 1 —Expansion of agar Distilled water added to 10 c cm of chopped agar (weighing 1.8 gm) at the point indicated by the arrow

graphic method of recording the amount of water absorbed by swelling substances, and this can be applied to agar. Briefly, the method consists in placing a known quantity of the substance to be investigated beneath a perforated aluminium piston, working in a dry, tall, vertical glass cylinder. The piston rests upon the material to be tested, which, in turn, occupies the bottom of the cylinder; this can be filled with water or other fluids. After passing through the perforations in the piston, the fluid comes into contact with the material, the resulting expansion raises the piston, the movements of which can be recorded upon a slowly revolving drum.

By this method Klecker found that 10 c.cm of chopped agar weighing 1.65 gm expanded to 60 c cm when placed in contact with distilled water. Repeating this experiment, I was unable to obtain an expansion of more than 22 c cm from the same volume of agar, weighing 1.8 gm., in 6 hours. This indicates that the amount of water absorbed was 12 c cm., and, while the cause of the discrepancy with Klecker's figures is not apparent, the result is comparable with that obtained by the method previously described. From these figures, it will be appreciated that one tablespoonful of agar (= 14 c.cm = 2.5 gm. approx) is capable of expanding to 34.0 c.cm., and this gives some indication of the bulk available in the faeces for

instituting a peristaltic reflex

*Digestion* —It is stated by Salki<sup>11</sup> that, in man, 10 to 20 per cent of agar ingested is digested and absorbed, while Lohrisch<sup>8</sup> states that herbivora can utilize 50 per cent. If agar is digested and absorbed in the intestine, a proportionately less amount is available for the purpose of which it was administered. I have not been able to demonstrate any delay in either peptic or pancreatic digestion, repetition of experiments described previously indicates that agar does not delay either of these functions *in vitro*

Agar can be detected readily in the faeces, and the swollen gelatinous granules can be seen with the naked eye. Microscopical examination does not prove that these contain ingested particles of food, and the available evidence indicates that agar is entirely without effect upon the digestive functions. It is probable that agar expands to the same degree in all parts of the alimentary tract. Klecker found that there was little variation in the final volume when agar was placed in contact with distilled water, tap water, acidulated pepsin solution and an alkaline solution.

#### BASSORIN

Bassorin is a hygroscopic substance which has recently been introduced into therapeutics as a laxative. It is a vegetable mucilage, insoluble in water, being the dried juice of a tree of the astragalus species (*stercualiacia*), which is indigenous to Africa, Persia, Syria and Kurdistan, and it is commonly seen in the form of white amorphous flakes or granules, known commercially as "normacol." Bulk for bulk, bassorin is much heavier than agar, and, although there is a slight variation in different samples, it can be ascertained that the average weight of 10 c cm of bassorin is 7.4 gm, whilst the weight of the same volume of chopped agar is only 1.8 gm. Experiments indicate that bassorin has a much greater capacity

placed in an adjacent loop did not cause any irritation, but at the end of this period it had not expanded to such an extent, neither was all the free fluid in the loop absorbed.

Bassorin is therefore a mechanical laxative which is considerably more effective than agar. It is entirely free from the objections possessed by liquid paraffin, in that it has no action upon the digestive processes.

#### CONCLUSION

This brief survey of the more commonly employed mechanical laxatives indicates that there are several important variations, both in the properties and in the mode of action, of substances which are frequently employed to produce the same therapeutic effect. It is quite clear, for example, that such good results cannot be expected from the administration of a swelling substance, such as bassorin, in those cases in which the intestinal musculature is weakened as from the administration of liquid paraffin. In these circumstances, the expansion of the former is without effect upon the weakened muscle, while the purely lubricating action of liquid paraffin is of considerable advantage.

The effect of liquid paraffin upon the digestion of foodstuffs and upon the absorption of the products of digestion has often been debated. Dr. Hurst, to whom I am much indebted for valuable criticism, has suggested<sup>5</sup> that emulsions of liquid paraffin are frequently successful when the oil alone is not well tolerated, and causes seepage. [The experiments quoted above confirm this view, and indicate that liquid paraffin, when present in the stomach in an unemulsified condition, will retard digestion. In this connection the part played by natural emulsifying agents present in foodstuffs must not be forgotten, for these substances are present in large amounts in green vegetables and fruits, which are frequently prescribed to be taken in conjunction with liquid paraffin. The

employment of an emulsion, however, should be sufficient to prevent undesirable effects in all cases

With regard to purely hygroscopic substances, the distinction between bassorin and agar is very marked. The former is a far greater hygroscopic substance, and can be taken in much smaller quantities in order to produce the same therapeutic effect. One teaspoonful of bassorin, on the basis of the figures quoted above, is equivalent to two tablespoonfuls of chopped agar, and these quantities will expand to the same volume. Both of these substances are, so far as can be ascertained, without action upon the digestive processes

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# The Diagnosis and Treatment of Some Common Intestinal Protozoal Infections

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PRACTITIONERS in this country often encounter gastro-intestinal conditions of a chronic and persistent character which may baffle diagnosis and fail to respond promptly to the usual remedies. In children and adults the clinical symptoms are by no means indicative of an infestation of the intestinal tract with animal parasites, and thus the origin of the symptoms may be entirely overlooked.

While it is a practice in tropical and sub-tropical countries and in hospitals for tropical diseases in this country to examine the faeces of all cases as a routine for the presence of protozoal or helminthic infections, it is the case that in this country and other temperate zones the stools are not examined microscopically unless there is a distinct intestinal disturbance associated with a previous residence in the tropics. Every case with chronic intestinal symptoms giving a history of residence in a hot climate ought to have the faeces examined for evidences of intestinal parasites.

Five species of amœbæ and five species of flagellates inhabit the human intestines in a percentage of the indigenous population of this country, and as a rule little importance is attached to such infections. Of these ten species it is only intended to deal with three, viz : the pathogenic amœba of man, *Entamoeba histolytica*,

and two flagellates, *Giardia lamblia* and *Trichomonas hominis*. *E. histolytica* is the causal organism of amœbic dysentery and liver abscess, and the two flagellates are associated with the so-called flagellate diarrhœas.

#### AMŒBLIASIS

Amœbic dysentery manifests itself in acute, sub-acute or chronic infections of the large intestine. Varying degrees of ulceration occur in the intestinal wall, and a certain proportion of such patients develop hepatic abscess, which may be difficult to diagnose. In patients who have never been out of Great Britain, either acute or chronic amœbiasis is rare, but the disease certainly occurs in this country and northern Europe, and it should be excluded in all cases of chronic colitis. During the Great War the fæces of every convalescent dysentery case was examined once or several times in order to determine whether or not they were "carriers." At the same time observations were carried further and extensive intestinal surveys were made on men, women and children who had never been out of Great Britain. These investigations were of such importance that a special memorandum by Dobell (1921) was issued by the Medical Research Council. The fæces of over three thousand individuals, who had lived all their lives in Great Britain, showed the presence of the cysts of *Entamœba histolytica* in 3·4 per cent of cases. Dobell pointed out that although *E. histolytica* is, and can be, a cause of human amœbic dysentery, it is, as a rule, comparatively harmless to the person it inhabits and may cause little or no inconvenience to its host. Very similar findings have been made in Europe, America and other temperate zones. The occurrence of a pathogenic amœba in the intestines of healthy individuals, unassociated with either a past history of acute dysentery or chronic symptoms, has puzzled clinicians and pathologists. This led Brumpt to conclude that there may be another

amœba, namely, *Entamœba dispar*, which is, perhaps, of very low pathogenicity, but otherwise is quite indistinguishable in its morphology from *Entamœba histolytica*. If this view is correct it serves to explain the occurrence of healthy carriers of cysts. It must be admitted, however, that a large number of observers in this country have not been able to accept this suggestion. Simic (1931), working in Yugoslavia, supports Brumpt's hypothesis. It seems quite unnecessary to assume that there are two species of amœbæ, the one pathogenic and the other harmless, which are indistinguishable morphologically.

It has been clearly demonstrated in other protozoal infections that, in addition to variations in the virulence of different races or strains of the parasites, certain individuals may be highly susceptible, others only moderately so, while a proportion are definitely refractory to infection. Apart from the absence of any specific morphological differences it is obvious that the two factors, viz : the resistance of the host to invasion and variations in the virulence of the organism may explain how perfectly healthy individuals can harbour the pathogenic amœba in their intestines without symptoms of disease.

This explanation is necessary in order that the practitioner may be able to assess the relative importance of reports on the fæces of his patients, for example, when cysts of *Entamœba histolytica* are found, the question arises as to whether any form of specific treatment is necessary. Whether a symptomless carrier, who has never been out of England and has never suffered from dysentery, should be treated or not, is a matter possibly of little importance. In actual practice this problem seldom arises because an examination of the fæces is seldom carried out except when signs and symptoms of intestinal trouble are present. The possible occurrence of intestinal amœbiasis and liver abscess must be borne in mind, as such

cases, although apparently rare, have been reported even in persons who have never been out of Great Britain. Amœbic infections are often insidious and long-standing complaints so mild in character as not to urge the patient to seek medical advice and treatment. Vague abdominal discomfort, mild tenderness over the colon, especially the cæcum, flatulence, gaseous eructations, loss of weight and a tired feeling are common in chronic amœbiasis. Diarrhœa may occur, but just as frequently there is constipation. Obviously such symptoms are associated with many other conditions, and, in the absence of more acute manifestations, such as the presence of blood or mucus in the stools, the correct diagnosis may be missed unless the fæces are examined for the parasites or the sigmoidoscope is used for the detection of the typical ulceration. Liver abscess, especially with its ill-defined symptoms, may not be suspected.

*The diagnosis of amœbic dysentery*—This form of dysentery is fortunately a rare disease amongst the indigenous population of Great Britain, but when it does occur it must be differentiated from bacillary dysentery and various types of colitis. In acute or sub-acute exacerbations of the disease the stool macroscopically is characteristic. The blood-stained mucus is a chocolate colour. If the stool is diarrhœic it may have the typical "sago grain" appearance, which consists of small blobs of mucus suspended in a fæcal stained fluid. This is well seen if the stool is transferred to a shallow glass plate. The diagnosis is clinched by the use of the microscope. The cell picture is remarkably free from polymorphonuclear leucocytes and, indeed, cells of any kind may be few and far between. The presence of Charcot-Leyden crystals, as emphasized by Thomson and Robertson (1920-21), strongly suggests amœbic infection, and, if motile amœbæ containing red blood corpuscles are seen, the diagnosis is complete. In chronic amœbic dysentery

there may be little blood or mucus. The stools actually may be formed and the small traces of mucus may be missed by the naked eye. In such instances the diagnosis is made by the finding of the characteristic cysts.

*The treatment of amœbic dysentery.*—The experience of numerous observers indicates that four preparations (namely, emetine, yatren, stovarsol and bismuth) are of value in treatment. During an acute attack of amœbic dysentery injections of emetine hypodermically are by far the most efficient method of controlling the condition. Twelve injections, each of one grain, should be given to an adult as a single course. It is inadvisable to continue the drug for a longer period owing to its toxic action, especially on the heart. The patient should be kept in bed during the treatment, on a light diet. After this treatment the patient may feel quite well, but it must be remembered that there is a tendency to relapse, and it may be necessary later to administer another course of a similar character. In any case therapeutic measures ought to be controlled by the examination of the stools for cysts.

Manson-Bahr (1931) described in detail what is known as the combined treatment for chronic amœbiasis. In long-standing chronic infections emetine is given in the form of emetine-bismuth-iodide (E.B.I.). Unfortunately, this treatment is unpleasant, extremely trying to the patient, and difficult to carry out unless under hospital conditions. Indeed, some patients cannot tolerate it. The drug is given by the mouth in three-grain doses as a maximum for a man and two grains for a woman. The length of the course varies from ten to twelve days. As an adjuvant, yatren has been introduced and now it would seem that the combined E.B.I. and yatren treatment holds the first place in the eradication of chronic amœbiasis. Yatren can be administered in three different ways: as a four-grain pill, of which six pills daily can be taken; in cachet form, each containing seven and a half grains,

twice daily by the mouth; or by an enema of 200 c cm. (8 ozs) containing five grains of yatren powder (i.e. a 2.5 per cent solution). In the doses mentioned above yatren is liable to produce intestinal disturbances and diarrhœa. This disadvantage can be overcome by administering the yatren in an enema. This method has many advantages. Before administering the yatren enema the bowel should be cleaned out with a 2 per cent solution of bicarbonate of sodium. Twenty minutes later the yatren should be injected and retained for as long as possible. This can be done for six to eight hours. The drug seems to exert a remarkable healing effect on amœbic ulcers.

A useful routine is as follows. The yatren enema is given in the morning and the E.B.I. by the mouth at night on an empty stomach, otherwise it will be vomited. Patients cannot keep E.B.I. down until they become accustomed to it. Manson-Bahr, therefore, begins with one grain on the first night, increases to two on the second, and on the third and subsequent nights continues with three grains. Some patients cannot tolerate more than two grains at any time. The drug is exhibited in gelatin capsules (not keratin-coated) and no food is permitted for at least three and a half hours before its administration. As a sedative one gram or one and a half grains of luminal or ten minims of tincture of opium may be used. Vomiting in the early hours of the morning is common, but may be regarded as of little relative importance. During the daytime a fairly liberal diet is permissible for the appetite is usually good. Manson-Bahr quotes the following as a sample daily regimen. Breakfast at 7.30 a.m. consists of tea, toast and lightly-boiled egg, and lunch of boiled fish, chicken and jelly. A light tea with toast and sponge fingers is given at 4 p.m. The patient *must* be kept in bed, no matter how fit he feels.

Willmore (1931) substitutes auremetine for emetine-bismuth-iodide. This preparation is a compound of

the dye auramine with the hydriodide periodide of emetine. Auremetine, in grain doses, is given four times daily in soft gelatin capsules on alternate days. On the days when the auremetine is not given, stovarsol, four grains three times daily, is substituted. The auremetine administered during twelve days' treatment is 48 grains, and the stovarsol for a total of seven days is 84 grains. Should a rise of temperature ensue, or a rash appear, it is an indication for the interruption of treatment for a few days during which the stovarsol should be stopped altogether. Also, alternating with the administration of auremetine, Willmore gives an enema of yatren. He starts with one litre of a 2 per cent. solution on the first two occasions, and subsequently gives a litre of a 4 per cent. solution. Lastly, during the whole course of treatment, a heaped teaspoonful of bismuth is given three times daily each day.

#### INTESTINAL FLAGELLATES

The only two intestinal flagellates which it is necessary to consider from the clinical point of view are *Giardia lamblia* and *Trichomonas hominis*. Much has been written in the literature on the question of their pathogenicity to man. Both occur in the indigenous population of this country, and *Giardia* is very common in children, but less so in adults. *Trichomonas*, as indicated by extensive intestinal surveys in this country, is a rare parasite. In the tropics, on the other hand, it is of frequent incidence in diarrhoeic and dysenteric cases.

*Giardiasis or lamblasis* —In an intestinal survey of about 3,000 individuals in Great Britain, *Giardia* occurred in 9.2 per cent. It is a rare infection in children under one year, but Nutt, in Leeds, found it in six children varying in age from three weeks to twelve months. The writer, through the courtesy of Dr. Bernard Myers, had the opportunity of examining the faeces of a large number of children of all ages in

London and found 8 per cent infected. Some of the infections were massive and possibly were responsible for gastro-enteritis and colitis. The youngest child found infected was one year and nine months old.

Many authors, especially clinicians, are of the opinion that *Giardia* is pathogenic and may be responsible for varied symptoms associated with nutritional disturbances, indigestion, abnormal frequency of defæcation, diarrhœa, mucous colitis, abdominal pain and tenderness, nausea, flatulence, nervous irritability, languor, headaches and nocturnal enuresis. The majority of parasitologists hold the view that there is no evidence to prove that *Giardia* can cause diarrhœa, chronic dysentery or any pathological changes in the duodenum or gall-bladder. The parasite establishes itself in the duodenum and jejunum where it may exist in enormous numbers. Since the introduction of duodenal intubation it is frequently demonstrated in the duodenal juices. It is suggested that the parasite may beset the duodenal mucosa so closely as to interfere with the gut function. It has also been described in the bile passages.

Taking into account that the habitat of this flagellate is the upper part of the duodenum, it seems quite feasible that the organism might cause certain symptoms, especially in children, with nutritional disturbances, indigestion, diarrhœa and the passage of mucus. Children with massive infections may be the subject of nervous symptoms, such as irritability and sleeplessness. The diagnosis can only be made with certainty by a microscopic examination of the fæces or duodenal juices. As regards treatment, it is a difficult flagellate to eradicate, but stovarsol by the mouth seems in many instances to reduce the intensity of the infection and tends to produce an improvement in the general condition.

*Trichomoniasis* — *Trichomonas hominis*, in this country at least, is a parasite of little importance. It



bismuth is used as a palliative for the cramps, colic and diarrhoea. No line of treatment can be considered as specific. Infection may be acquired from "carriers" or by contamination with the faeces of pigs in which *Balantidium coli* is a common parasite.

How man derives the rare sporadic cases of coccidiosis is not known. In this disease the causal organism, *Isospora hominis*, multiplies and has its being in the epithelial cells of the mucosa, and causes their destruction. No fatal cases are on record, but a severe and debilitating diarrhoea may persist for about six weeks or longer. Spontaneous recovery without treatment is the rule.

Lastly, in conclusion, mention must be made of the controversy which is at present taking place as to the part played by spirochaetes in the causation of chronic colitis. It has been found that in certain cases, for which no ostensible cause, either bacterial or protozoal, can be adduced, the plentiful mucus is literally swarming with *Spirochaeta* (*Treponema*) *eurygyrata*. The absence of any assignable cause for the colitis other than the spirochaetes is practically the sole evidence in favour of the spirochaetal theory, whereas the fact that *T. eurygyrata* is common in the intestines of healthy individuals lends colour to the belief that its increased numbers are due to the favourable conditions provided for growth and multiplication by the chronically inflamed state of the gut wall.

# Lumbago and Allied Conditions

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THOSE who have reached middle life without experiencing pain in the lower part of the back must consider themselves particularly fortunate, even though attacks of pain in this region are generally of short duration, and recovery is more or less spontaneous. The victim, however, is usually in sufficient distress to apply some form of treatment, or to seek a prescription for his relief. It is not unnatural to attribute spontaneous recovery to the treatment applied, though actually recovery often takes place in spite of the treatment and not because of it.

The complaint is a frequent one, so the number of suggested remedies is legion, and each has its firm advocates. Our first aim must be to inquire into the common factors of these various remedies, and to them must be attributed the praise and popularity of the "cure." Then we must endeavour to establish a connection between the pathological conditions present and the way they can be affected by the suggested remedies. Those patients who do not recover so rapidly will still remain for consideration, both as regards causation and treatment.

Heat or rubbing are the only two remedial factors common to all the multitudinous household remedies available for relief of backache. One or other or both must be employed with every form of remedy for external application. Most of the remedies act as rubifacients, though the menthol group is also much favoured. Factors common—either separately or combined—to all internal remedies are the increase of

fluid intake and the administration of an analgesic. These remedial factors will now be considered.

#### EXTERNAL REMEDIES

*Heat.*—Conducted heat would seem to be an instinctive remedy, and perhaps it has the most advocates. A hot-water bottle, an electrically heated pad, or a hot bath are all simple forms of it. Then there are the various forms of home-made poultices, cataplasma kaolin co., antiphlogistine, and the many mud-pack preparations. A hot iron applied over brown paper combines heat and rubbing, and, in a lesser degree, the same can be said of the hot bath. All the poultice group have the advantage of supplying support, and so combine an element of splintage with the heat. This permits the relaxation of any protective spasm which may be present. In this respect the hot bath is unique, as, owing to the elimination of gravity, it allows relaxation and also freedom of movement when the tendency to spasm has passed.

Radiant heat is also a popular remedy, and there are many forms of heat-lamp on the market. They have little merit beyond convenience for administering heat to a patient recumbent in bed, and are probably a disadvantage when compared with other remedies, except as counter-irritants. The red glow of an incandescent burner from a gas or electric stove is far more potent in the infra-red, or actual heating, rays. Contrary to the common belief, ultra-violet rays convey no heat. The delusion that they do so is no doubt due to the popular description of an ultra-violet lamp as a "sun-ray lamp." Carbon and tungsten arcs emit a large amount of heat with the ultra-violet waves. The most penetrating heat is obtainable from a good-class infra-red-ray lamp.

*Massage or rubbing*—This is so potent for good that, though it varies very much in different hands, it is often efficacious in spite of ignorant application. It

requires gross abuse before its efficacy can be altogether destroyed; scientifically and skilfully administered it will often succeed where less enlightened treatment has completely failed to alleviate, or has even increased the severity of the symptoms. Aids to rubbing are on the market in the form of wooden rollers and vibrators, either hand-driven or electric.

The best remedy for any complaint is selected by studying the methods of treatment employed in the countries where the complaint is most prevalent. Low backache appears to be particularly common in China, and the Chinese masseur deals with the condition by picking up folds of skin with the index and middle fingers when the middle phalanges are flexed to a right angle with the proximal. This is a tedious and clumsy business, and not to be compared with the old-fashioned remedy of dry cupping. Any ordinary glass can be used for this purpose. It is heated in hot water, the rim pressed on the skin, and then allowed to cool. The skin is thus sucked up into the glass. Various cupping glasses can be bought, the best type is provided with a rubber bulb which produces the suction, and the glass can easily be slid along the surface of the skin, if it is previously smeared with oil or white vaseline.

*Ointments, liniments and similar applications.*—The prescription for these—with few exceptions—runs “to be well rubbed into the part affected.” It may be stated at once that the amount of medicament absorbed is very small, that it can only be absorbed into the lymph spaces, and that, on account of the rubbing, it must be dispersed very rapidly into the general lymphatic system. Any local action must therefore be very transitory, and is doubtless of negligible consequence. The actual rubbing is efficacious, and as all are to be “well rubbed in,” doubtless the word “in” has led to the misconception that it is the absorption that does the good rather than the rubbing. Some advantage may be gained from the substances

containing menthol or a rubifacient matter. These act as counter-irritants much in the same way as the radiant heat derived from the incandescent-light lamps.

#### INTERNAL REMEDIES

*Medicinal waters.*—The merits of the properties of the waters of the various spas are all lauded to the skies by their respective advocates, yet these vary in composition so much that they must all owe their potency to a common ingredient—of which the only one is water. This naturally does not apply to the waters which have a definite aperient action. Some may have a definite selective action and stimulate the activities of the kidneys, but any increase in fluid consumption gives this result. It occurs whether the water is hot or cold, whether it contains lemon and is called lemonade, ginger and is called ginger beer, a few tea leaves and is called weak tea, or barley and called barley water. The water is always present, even if a little whisky is added to ensure that it is imbibed.

*Various medicaments.*—The salicylates are the most popular of the variety of medicaments prescribed, and of them caffeine-salicylate should probably be given the place of honour. It acts as a definite aid to excretion, but it is the common salicylic element, as it was the common water element in the previous paragraph, that does the good. The opium derivatives hold the palm as remedies for allaying severe pain, and one could not wish for anything more potent and efficacious than 10 grains of Dover's powder and 10 grains of aspirin, washed down with a long drink of lemon and hot water, with an ounce of whisky added. If there is intense muscular spasm and the pain is caused chiefly by cramp, an injection of 10 c.cm of a  $\frac{1}{2}$  per cent novocain solution into the muscles will sometimes act as if by magic.

We will now endeavour to ascertain how these several remedies can affect the various existing patho-

logical conditions. With the exception of the internal medications, all the remedies mentioned so far aim at securing two effects. The first and most important is to encourage more efficient working of the lymphatic system, the second—perhaps only a corollary of the first—is to restore freedom of movement. Possibly some little understood reflex effect follows cutaneous stimulation as produced by heat or counter-irritants. Unfortunately, we encounter many cases of low back-ache for which these comparatively simple remedies afford no relief.

#### DIAGNOSIS

The symptoms may produce a condition varying from an occasional mild annoyance to one of complete incapacity. It must be remembered that the spontaneous appearance of backache, which begins as a scarcely noticeable ache, but tends to increase steadily, may, in patients past middle life, be the first symptom of deep seated trouble, such as carcinoma of the pancreas or prostate—to quote two recent examples. Pain in the back must always be regarded as a grave symptom in patients who have had any form of malignant disease, whether previously operated upon or not. The diagnostician must always bear in mind the possibility of tuberculosis and Paget's disease, though in either case definite diagnosis depends on X-ray examination, at least in the earlier stages. Tuberculosis calls for complete and prolonged rest, and Paget's disease for a six months' course of general ultra-violet light combined with the administration of parathyroid and calcium, preferably in the form of ostein.

Backache, as part of a general condition, may be due to absorption from a septic focus, and relief often comes after the removal of a tooth with an abscess round the root, a septic tonsil, or after attention to intestinal absorption. Colonic irrigation with a weak solution of potassium permanganate has relieved many an inveterate case. There are frequent reports

of almost dramatically rapid "cures," and it can only be supposed that these are examples of relief from a visceral reflex.

Persistent pain in the lower part of the back may be due to local causes. The only joints that need consideration in this region are the sacro-iliac and the lumbo-sacral. We were taught, in the past, that the sacro-iliac joint was a synchondrosis and that no perceptible movement took place there. This theory is proved to be an error by measuring the space between the posterior-superior spines of the ilia with the patient first in the sitting position and then in the prone position (forward lying) and by comparing the two measurements. It is not unusual to find a difference of half an inch or more. This can only be due to the fact that, with the change of position, the ilia have rotated backwards on the sacrum in response to a backward torsion strain (clockwise rotation). The knowledge that this joint has a definite, though naturally limited, range of normal movement—the presence of a joint cavity with a synovial membrane should be adequate proof—tells us that it is liable to all the ordinary changes which may beset a joint in any situation.

Trauma will cause traumatic synovitis; prolonged strain will cause stretching of the ligaments with associated pain, as in some cases of flat foot; prolonged forward torsion strain will cause the ligaments on the back of the joint to become sensitive. An examining thumb is placed over the posterior-superior spine of the sacrum and is then made to slide first outwards and then inwards. If, on pressure over the former point, tenderness is detected, it is due to a sensitive deposit in the structures over the gluteal aspect of the posterior superior spine. If the tenderness is over the inner point, then it is probable that the posterior ligaments of the sacro-iliac joint are strained and sensitive. Sensitiveness in the anterior ligaments can be detected by examination of Baer's sacro-iliac point (of which

mention should be made in every medical and surgical textbook, though it is usually completely ignored). If the tenderness is increased by pressure backwards on the anterior superior spine of the ilium, and decreased by pulling forwards the crest from behind, then we have positive proof that it is caused by the sensitive ligaments.

If the coccyx is not free to move, then any backward torsion strain of the sacro-iliac joint will lay undue strain on the ligaments uniting the coccyx to the ischium. Tenderness in these ligaments can only be detected per rectum. Backache does not often arise from this cause, but when it does it is intractable. Cure depends on one of three things: first, restoration of mobility to the coccyx, second, its removal; third, the continuous wearing of some apparatus to limit movement of the sacro-iliac joints on the sacrum. If there is any uncertainty as to the ligaments being sensitive, the sacro-iliac joints can be moved so, as to occasion ligamentous strain. A backward torsion strain is laid on the joint whenever the hamstrings are stretched while the hip is flexed forwards. If, in the recumbent position, the leg is raised with the knee extended, there is tension on the hamstrings, and therefore on the ischial tuberosity. This causes the whole os innominatum to rotate backwards (counter-clockwise) on the sacrum.

Trouble within the joint will not only cause pain locally, but also will make it radiate down the leg. It is important to differentiate between pain referred from this movement of the sacro-iliac joint, and pain due to tension on the sciatic nerve. If the foot is dorsiflexed (Fig 1) when pain is first noticed, increased tension is laid on the sciatic nerve by the pull on the terminal branches, but no extra tension is laid on the hamstrings—if the movement is carefully performed. If the hip is further flexed, when the point is reached that the ilium is fully rotated backwards on the sacrum,



the further movement must be transmitted to the sacrum, and this then moves both on the opposite

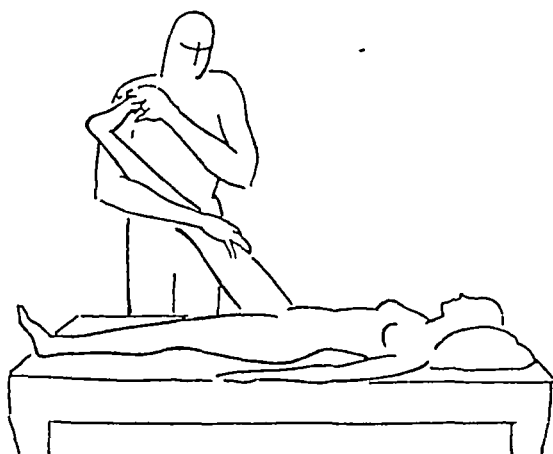


FIG 1

This and the following illustrations are reproduced from the author's monograph "Backache," by courtesy of the publishers, Messrs J and A Churchill

sacro-iliac joint and on the fifth lumbar vertebra at the lumbo-sacral junction. Any pain caused by trouble in the lumbo-sacral joints will, at this point, be felt in the middle of the back. If the pain is due to movement of the sacrum on the ilium of the opposite side, it is caused by a forward torsion strain of this joint. Now the pain will be referred to this opposite side, and possibly down the leg. In the side-lying position, a backward torsion strain can be laid directly on the joint by pulling back the anterior superior spine with one hand, while pushing forward the ischium with the other (Fig. 2). A forward torsion strain can be produced by hyper-extension of the thigh with the knee flexed, as this lays strain on the rectus and on the Y-shaped ligament.

The strain is confined to the sacro-iliac joint if the pelvis is fixed as shown in Fig 3. If pain is produced in this position it may be relieved by releasing the knee of the opposite side, thus transferring some of the strain to the lumbo-sacral junction. Pain from abnormal movement of the sacro-iliac joint can be relieved in

this way Further forced movement will soon bring the lumbo-sacral junction and the joints of the lumbar spine to the limit of normal movement, and strain will

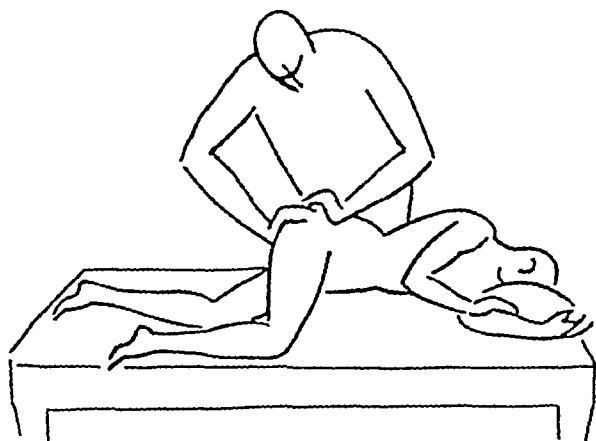


FIG 2.

again be felt on the sacro-iliac joint Should the pain reappear we have a sure diagnostic sign. If the movement is painless in the position shown in Fig 3,

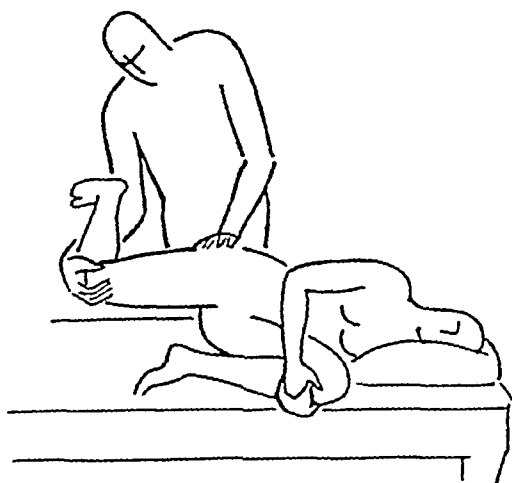


FIG 3

but painful when the left knee is released, then it must be caused by movement at the lumbo-sacral junction or in the lumbar spine. All these movements can be checked with the patient in the prone position,

as shown in Fig. 4.

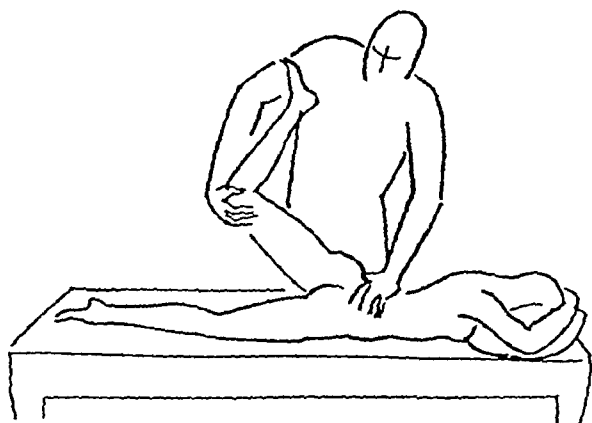


FIG 4

If the sacro-iliac joint is at fault it offers the same possibilities of treatment as any other joint. It can be fixed, supported, or moved. Fixation may afford the only chance of relief should the joint be flail and tend to lock frequently, but it is rarely necessary. Support may be given by a low corset, with a horizontal webbing band round the pelvis fixed to the corset by loops at a level just below the anterior superior spines of the ilia in front and across the sacrum behind. Further support in the form of plates can be used either with the corset or independently. The need for support is usually indicated when the patient complains of pain when both backward and forward torsion strain is exerted. Manipulation is advisable when pain is felt from torsion strain in one direction only. It is also the best treatment for all acute cases when pain has been caused by some unguarded movement, however trivial (e g stepping out of a bath). It will often cut short attacks of "traumatic lumbago" if it can be done immediately. Support should be provided after this manipulation.

Chronic strain due to posture—lordosis or flat-back deformities—should be treated by support, though occasionally manipulation is required as well. Side-bending movements of the lumbar spine should be

examined as well as those already mentioned. This is best achieved with the patient in the lying position (Fig 5). This manipulation also serves to release a lock and can bring relief to cases when the lumbo-sacral junction is locked, as so often happens when the fifth



FIG 5

lumbar vertebra is situated unduly highly between the ilia. This position of the junction renders it unstable, and it is liable to lock easily. Should side-bending be painful in both directions it is well to support the joint.

Certain bony abnormalities are also potential causes of low backache. An unduly large spinous process is liable to impinge on its neighbour during hyper-extension of the trunk. This trouble is found among tennis players, and the pain is due to the nipping of the soft structures between the bones. A suitable plate prevents the painful movement. If a "spina bifida" is present, the nipping is even more liable to occur. An enlarged transverse process of the fifth lumbar vertebra, or actual sacralization, is always liable to cause trouble—contrary to the usual teaching. If present, it means that there is little movement at the lumbo-sacral junction, so that if, as the result of any accident, the ligaments are stretched and there is an increase in mobility, this permits a nipping of the soft structures

toe-nail is excited into an acute condition generally by a slight accident, and it usually passes into an obstinate, subacute ailment by using the homely remedies of poultices of bread, soap or linseed, iodine and baths. Its recurrence is ensured by the frequent, thorough clipping off of the corners of the nail, thus stimulating further ingrowth at the sides. A "whitlow-like" condition involving all of the hallux occasionally arises with one of the acute exacerbations.

Operations for removing all or part of the nail, or plastic procedures on the soft tissues of the toe need be mentioned only in order to condemn them emphatically, very rarely indeed should they be necessary, even in advanced forms. The treatment of the condition, tersely expressed, is to "leave the nail alone." This is carried out by the following measures —

(1) Fitting shoes or boots of adequate size. Large enough socks or stockings, which must be frequently changed, that tight socks are playing a part in the causation of the pain about the hallux is suggested by its occurrence at some periods and not at others; with wear and washing socks shrink, becoming smaller and thicker, bunching the toes together in an unyielding embrace.

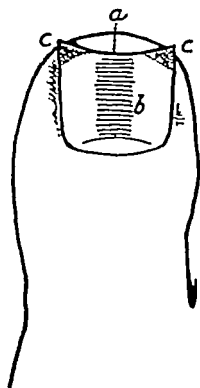


FIG 1 —The ingrowing toe nail showing —(a) The method of cutting the nail (a), (b) The shaded area (b) is the surface which is scraped by the scissor blade or file, (c) The corners are not cut until they protrude beyond the end of the toe

(2) A rapid daily bath to the feet and gentle slight touching of the granulations with a match stick dipped in tincture of iodine, and applying a small dressing

(3) Cutting the nail with round-ended scissors, in the fashion shown by the diagram (Fig 1) at weekly intervals. The corners and sides should be carefully avoided and snipped off only when they project beyond the end of the toe. By scraping the surface

of the nail at its centre with a file or the blade of the scissors, growth is stimulated here and possibly slows the ingrowing tendency

(4) All manicuring, baths, special dressings, insertion of woollen plugs, and fomentations are inadvisable and should be discontinued.

(5) During an acute attack the patient should lie up and compresses of magnesium sulphate and glycerin should be applied daily; no other active treatment is necessary

Careful "follow-ups" of cases treated on these lines (they had all been well established before being sent to hospital for advice) justify the assurance that this method is sound

#### THE SUBUNGUAL EXOSTOSIS

This is a small outgrowth of cancellous bone usually arising from the dorsum or sides of the terminal phalanx of the hallux; in my experience it afflicts women more often than men. Its periosteum is intimately associated with the nail bed, so that this new growth quickly interferes with the contour and unobtrusive function of the nail. The nail bed is elevated, usually unevenly, so that painful rubbing by the shoe ensues. The nail may be split and the outgrowth protrude, looking like the kernel of a hazel nut lying in its opened shell. X-ray examination is advisable in all persistent ailments of the hallux—it may reveal an unsuspected exostosis

Prompt surgery is the treatment for it. This consists in the removal of all, or part of the nail to expose the swelling, incision and reflection of the covering nail bed, and shaving the bony outgrowth down level to the normal phalangeal surface, with a "scalpel sharp" chisel. The raw bone area left is made

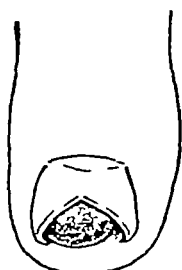


FIG. 2—The subungual exostosis of the terminal phalanx of the hallux, the nail has been cut around it

smooth and dry by rubbing in a little sterilized Horsley's wax. A dressing is applied and a light plaster of Paris to the foot, in which the patient walks after three days, followed by a stout shoe or boot. Complete healing is sometimes delayed for several weeks, but this does not incapacitate, while normal restoration of the nail may take up to three or even six months

#### HALLUX RIGIDUS AND VALGUS

These may conveniently be considered together, as in most cases there is the same underlying cause, a flat foot. This deflects the foot outwards, and the line of gravity (and with it, body weight) instead of passing through the heads of the second and third metatarsals goes through that of the first, thus inflicting on the first metatarso-phalangeal joint abnormal weight and stresses, which slowly provoke in it the changes of traumatic osteo-arthritis, i.e. thinned cartilage, bony lipping around the dorsal and inner sides of the head, peri-articular thickening and callosities with limitation of function and a rigidus or valgus deformity of the big toe.

In hallux rigidus, while the line of the toe is normal, there is at first inability to extend the metatarso-phalangeal joint. Later there follows pain and stiffness on movements, which call for extension of the hallux, such as standing on the toes, "stepping off" in walking, or running up or down stairs. The interphalangeal joint compensates to some extent for this deficiency in dorsiflexion, but the extra strain occasionally causes an *ingrowing* or crumpled condition of the nail, thus emphasizing the necessity for a survey of the foot as a whole, even though the complaint is small.

There is a bony ridge, often visible through the patient's shoes, over the head of the first metatarsal; the skin here is thickened, later it is tender and reddened, until an adventitious bursa, popularly known as a bunion, develops (Fig. 3). This is liable to frequent

and recurring attacks of bursitis, and on account of there being no obvious deformity, in the hallux rigidus condition, the cause may be unsuspected, and be

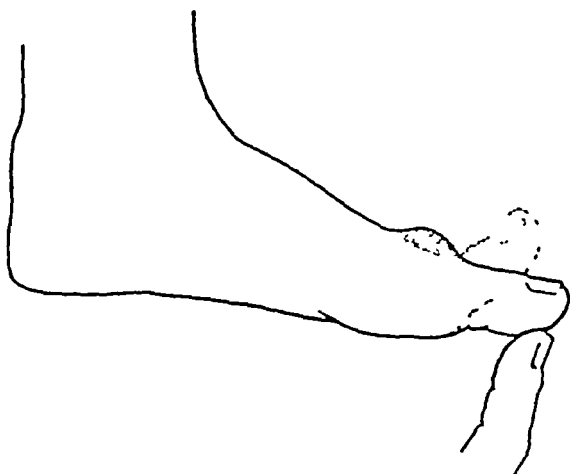


FIG 3—The hallux rigidus. There is no dorsiflexion even with the finger pressing under the big toe. The dotted outline indicates the normal range of movement. Note the dorsal situation of the bunion.

diagnosed as “? gout,” “? angio-neurotic oedema,” “? acute rheumatism” or “? early thrombo-angutis obliterans”

Hallux valgus may occasionally be combined with hallux rigidus, but it is a separate entity. It is characterized by the whole big toe pointing markedly outwards, either over, under or against the second toe (Fig 4). Unbalanced muscular action in the presence of pes planus, unsuitable socks and shoes, are the exciting factors. With regard to socks, it is not generally realized how freely the foot perspires and that a sweat-soaked sock shrinks down and loses its elasticity. This is the explanation of the previous advice, i.e. to change the socks or

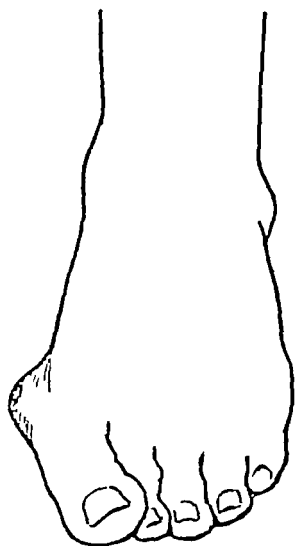


FIG 4—The hallux valgus. Note the bunion is on the inner border of the foot.



stockings frequently—and they must be large enough. The extra strains in this abnormal position cause traumatic osteo-arthritis in the metatarso-phalangeal joint. The changes are chiefly on the inner side of the unduly prominent head of the metatarsal, with osteophytic formation; while in the rigidus condition, it will be recollected, the bony changes are chiefly on the dorsum of the head. Pressure of the skin leads to an adventitious bursa on the inside of the head of the metatarsal, which is liable to inflammatory attacks, occasionally even suppurating with a surrounding cellulitis. When this arises, the danger of a septic arthritis is quite real, as sometimes the bursa communicates with the joint.

#### MANAGEMENT

I use the word “management” in preference to “treatment,” as this expresses more aptly one’s plan of action. It resolves itself into:—(1) The correction of the underlying flat foot (2) The adjustment of the footwear to relieve the valgus or rigidus deformity (3) The care of the feet. (4) The consideration of surgical operation (5) The care of the bunions.

*The flat foot*—A full description of this condition is outside the scope of this article, as a complete discussion of it would extend into many pages. Adequate provision for the arches of the feet is provided for by fitting patients with a good pair of well-designed, stout walking brogues for women, and an officer’s or men’s type of service boot (according to the patient) for men. The usual difficulty is to obtain sufficient width, but first-class boot-makers can usually supply this. Patients find, with considerable misgiving (especially women), that when their feet “go wrong,” they are not only painful, but also larger, the steadily growing row and size of their unwearable shoes is indeed a grievous sight to them.

If sufficiently broad or suitable boots are not procurable, a bespoke pair will be necessary. Expense is usually a governing factor, thus I advise ready-made shoes first. Patients often demur about the cost, but when it is explained that the type recommended will probably outwear twice or thrice an ordinary pair and enable them to walk comfortably, they usually take the advice. Low wide heels are not essential, they discourage women wearing the shoes, and even cause pain on walking; a widish high heel suits the case. Robust boots or shoes need not necessarily be

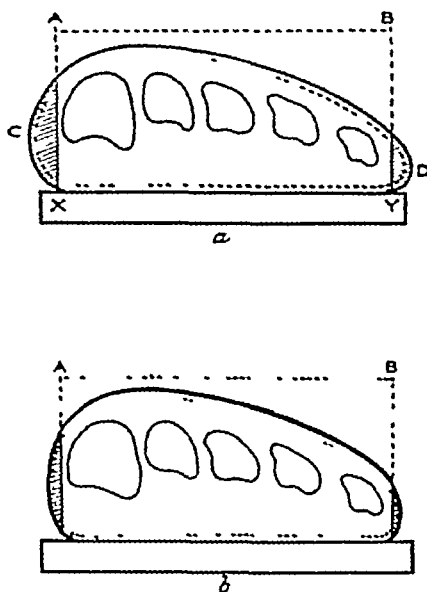


FIG 5—A diagrammatic transverse section of the "tread" of the foot (a) Shows a badly fitting shoe which, not being wide enough, is bulging at the sides C and D, and the foot is "spilling" over the available width AX, BY (b) Shows an adequately fitting shoe whose width AB is equal to that of the foot. Note the fit is determined by feeling the tension of the widest part of the "shod" foot when the patient is standing (not sitting)

unsightly. To determine if the foot-wear is wide enough, the patient should stand in them, and the widest part of the foot felt and found to be equal to the width of the boot, often the foot will be felt to be "spilling over" the width available, as in Fig 5.

The sole should be stout, say,  $\frac{1}{16}$  in for women and  $\frac{9}{16}$  in for men, thus it will retain its contour on

uneven ground and not permit ground irregularities to be felt by the foot. Lace-up patterns are preferable; button-bar types do not give the shoes sufficiently firm purchase to the feet, in order to provide support on uneven ground. The inside edge of the shoe should be approximately straight, not curving in to a point. In a bespoke pair of shoes the ordinary stiffening can be carried further forward than usual, and in an advanced case, a piece of spring steel incorporated in the sole.

*The corrections to the boot.*—(a) *For the flat foot:* They aim at transferring the weight to its normal line and also at supporting the stressed areas. To relieve the inside. elastic longitudinal arch, the inner side of the sole and heel are wedged  $\frac{1}{8}$  in. to  $\frac{3}{8}$  in. (according to the amount of planus and valgus deformity of the foot); this transfers some of the weight to the outer longitudinal bony arch. To further support the inner arch, the inside of the heel is lengthened  $\frac{1}{2}$  in. to 1 in according to the size of the foot and the amount of flattening (Fig. 6) This is spoken of as crooking and elongating the heel. These measures will relieve the average pes planus when

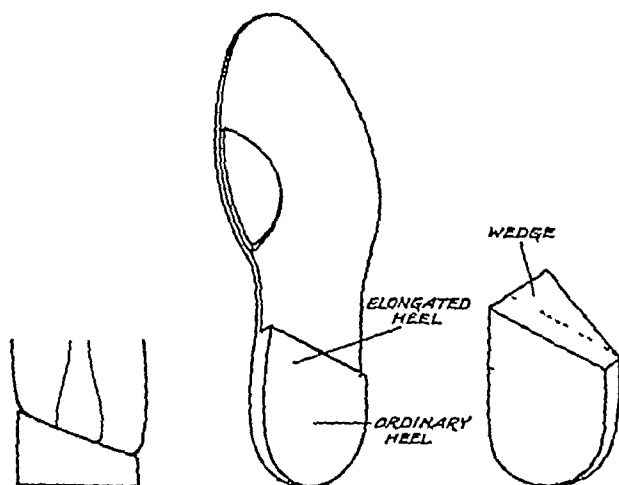


FIG. 6—A shoe fitted with the inner side of the heel elongated and raised and the sole with an inside wedge (the latter is not obvious when placed under the sole, not "on it" as drawn here).

worn for three to twelve months, after which the need for adjustment may be no longer necessary. A severe degree may even need an outside iron with an inside T-strap to the boot for a time. This is a very positive support and will relieve pain in osteo-arthritic feet of old people; it can be made quite unobtrusive and light (of duralumin); the metal stay being inserted between the leathers of the upper, whilst in winter-time, ladies hide it under gaiters.

(b) *For the hallux valgus and rigidus*. These are relieved by placing a metatarsal bar across the sole behind the tread (Fig. 7). This takes the weight

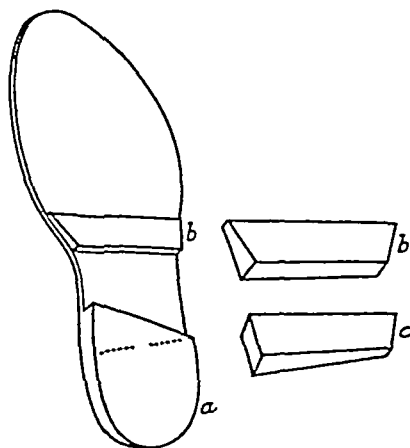


FIG. 7—A shoe with the metatarsal bar (b). (c) Shows how the bar may, if necessary, be wedged from inside to outside.

from the heads of the metatarsals and transfers it to the necks, thus relieving the metatarso-phalangeal joints. By making this bar wedge-shaped, so that the inside is, say,  $\frac{5}{16}$  in. thick and the outside  $\frac{3}{16}$  in., the weight is canted more to the outer part of the foot, away from the stressed hallux area, but this may not be necessary in all cases. Again, it is frequently necessary to prescribe differently for each foot, the amount being judged by observing the patient standing, from in front and behind with the shoes on.

There are several points with regard to the construction and placing of this transverse bar which are

worthy of mention, as on them its success depends :— (1) Its position—it must be behind the tread, so that its front edge just touches the end of the tread. Often I find it placed on the tread, and accompanied with the report of “my feet are not better yet !” (2) If the boots are new, the patient should wear them for three days before it is applied, in order to mark out the tread. (3) It must be “made-up” behind in order that its surface is parallel to the sole (Fig. 8). (4) These patients are heavy “walkers,” the sole wears quickly and is best made of “dripped.” (5) If the shoes are bespoke, it can be incorporated under the sole, thus

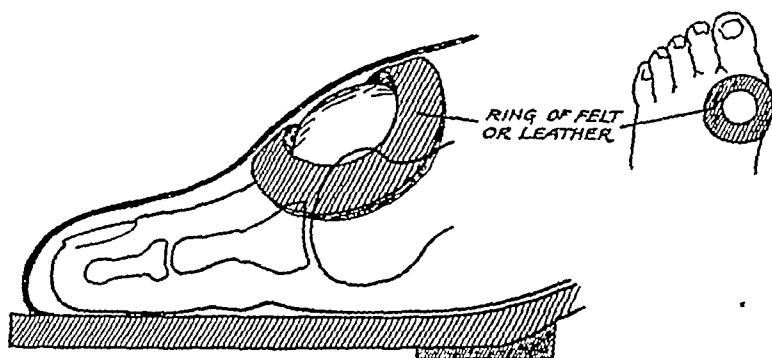


FIG 8—Shows (1) the rationale of a felt or leather ring round a bunion, thereby lifting the shoe off it, (2) the metatarsal bar under the neck of the metatarsal, and it also illustrates a constructional detail, the “making-up” of the bar behind

rendering this “surgical shoe” more acceptable æsthetically.

*The care of the feet.*—From this, well carried out, a great deal of comfort is derived, patients who regarded the instructions as “a lot of bother” speak enthusiastically about their effectiveness in a short time. The principles are explained at the first consultation and start at once, even though the boots, etc., are not yet ready. A card with the main points printed on it (the italicized sentences which follow) is given to them as a reminder —

(1) *Scrub the feet and legs daily in hot water with a soft brush or loofah*—This ensures a form of homely and effective massage to the feet and muscles of the calf, the actual bending is also beneficial to the abdomen

(2) *Wear thick stockings or socks and change these frequently*

(3) *Avoid Standing*—Standing strains the already weakened calf muscles, calling for a sustained muscular effort, whilst walking calls for an effort alternating with momentary rests

(4) *Walk with the toes pointing directly forwards, never turned outwards*—This tends to throw the weight on to the outsides of the feet—that is, away from the strained inside arches. The old-fashioned custom of walking with the toes turned outwards is a mistake, but it is “dying hard”

(5) *Shoes or boots must be worn from the moment of getting out of bed, until getting into bed at night*—This ensures arch support all day

(6) *Never walk in soft slippers or in stockinged feet*—This avoids unsupported arches

(7) *When sitting, the feet should be put up on a chair or couch, if possible*—This permits an easy venous return and removes the weight of the legs and thighs from the feet (this is considerable, as is readily realized when carrying an amputated limb, or holding a limb during operation. Whilst sitting thus, patients may remove their boots, but must put them on before moving

(8) *Practice moving the feet and toes up and down about twelve times before or after food daily, also when in bed, on the bus or on the train*—This retones the muscles of the feet and calf, and is definitely helpful, although it appears to be a trivial exercise. Later, walking on tip-toe and on the heels can be practised

If faithfully carried out, relief is early, and ability to stand the racket of ordinary life, with the adjusted shoes, usually takes six to twelve weeks. After a year, some of the joint thickening and stiffness disappears

*The consideration of operation*—In bad cases it is necessary; in those of moderated degree it can probably be avoided, and in the early stage, is definitely not indicated. Persistent pain and disability are the indications. Gross deformity with marked changes in the joint shown by X-ray examination is quite compatible with a fairly comfortable existence. An inspection of feet in a public park on a Bank Holiday will quickly convince one of the long-suffering nature of the foot

Just as a gastric or duodenal ulcer patient is not advised operation until dieting has been taught and a long course of medical treatment given, so no patient

with a disability of the foot is offered operation until:—(1) the toilet of the foot has been practised; (2) suitable and corrected footwear has been fitted and worn for six to twelve weeks; (3) the effect of practising exercises to re-tone their foot and leg muscles has been tried out. Otherwise, by the neglect of these points, the results of perfectly performed operations fall short of the best possible. Briefly, the operation consists in the wide excision of the metatarso-phalangeal joint, in order to secure good mobility. With a “scalpel sharp” chisel the lipping is shaved off the metatarsal head and the whole base of the first phalanx of the hallux removed.

*The care of the bunion.*—If the bunion is distended and suppuration is suspected, early aspiration and incision if pus, should be carried out. This avoids a possible extension of infection to the joint. Rest in bed, evaporating lotions and firm bandaging to the well elevated foot quickly bring relief. When a subacute stage is reached, a hole cut in six or seven thicknesses of chamois leather or adhesive felt (obtainable in various thicknesses from the makers of Zopla plaster) to fit easily around the bunion (not on it), so that the shoe is lifted away from the inflamed area, quickly eases discomfort and the thickness of the ring can be gradually lessened (Fig. 8).

#### CONCLUSION

No mention of the hallux ailments would be complete without a reminder that very “obstinate” sores on it, say about the nail or callosities on the dorsum, side and under surface, may be due to tabes, nerve disease or a spina bifida occulta—the last is hinted at by a fatty, hairy tuft over the lumbar spine, and confirmed by X-rays. Patches of redness, small inflammatory foci, “weeping” corns in elderly people suggest diabetes or incipient gangrene, the latter often being confirmed by the X-ray of the leg showing calcified

tibial arteries. This indicates the wearing of several pairs of socks or stockings and a generous stout boot, and great care in washing and manicuring to avoid an abrasion. It is a prudent policy to X-ray all painful feet; quite unsuspected bony changes are frequently revealed.

In particular would I conclude by mentioning the condition of *pied forcé*, which manifests itself by chronic discomfort and later moderate swelling over the shaft of the second or third metatarsal. Clinically and radiologically it may strongly suggest a fracture with a very mild reaction. After overuse of feet unaccustomed to strain, e.g. in army recruits and very enthusiastic hikers, a fracture of the shaft occurs quietly, without particular incident or pain. Early during the war, a battalion in France had two hundred men "confined to barracks" by "hysterical flat feet." X-rays were not so universally in use in those days, but a surgeon who saw some of them advised it, and ultimately numerous cases of *pied forcé* were revealed, caused by long route marches with full packs during intensive training. Treatment consists in supporting the feet adequately in a stout plaster or boot until X-ray examination shows sound bony union, in addition to care of the feet on the lines already described. This condition may account for a few of the cases of obstinate pain in the feet, which are cropping up at present due to "over-hiking."



# Insomnia

By ANTHONY FEILING, M D , F R C P.

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WHILE a frequent symptom in the course of many serious organic diseases, insomnia is very often the sole apparent departure from health for which a patient seeks relief. In every case a strict investigation must be carried out in order to discover its causes. These may be broadly classified into: (1) those due to physical disease; (2) those due to mental or emotional disturbances; and (3) purely external causes such as noise, cold or extremes of heat.

The more important physical diseases can be classified as follows. (a) pain or severe discomfort from injury or disease; (b) toxæmic states in many infectious diseases or in such conditions as uræmia, (c) disorders of the cerebral circulation in heart disease, altered blood-pressure and anæmia, (d) structural disease of the brain; and (e) indiscretions in diet and other disturbances of the alimentary tract. Among the mental or emotional causes a distinction should be drawn between those due to simple anxiety and those occurring in the true psychoses, either in excited patients or in those suffering from states of depression.

Insomnia due to pain is naturally the easiest to diagnose and often not difficult to treat. When the pain is really severe some form of opium or morphine is generally necessary. When the pain is less severe, or when the condition is one in which the prolonged use of some analgesic is likely to be needed, it is better to try to defer the use of opium as long as possible. The value of purely local remedies should not be forgotten. Thus heat, whether in the form of poultices or the popular antiphlogistine, or even the homely hot-water bottle, may just make all the difference between

comfort and discomfort. And in this connection the great benefit that may be conferred by the old-fashioned leech in the pain of pleurisy or pneumonia may also be borne in mind when the use of opiates is for any reason contra-indicated

Among the analgesic drugs that may be useful before opium or morphine is employed we may mention the following aspirin, phenacetin, pyramidon or veramon, allonal is often very useful. A combination such as 5 grains each of aspirin and pyramidon with  $\frac{1}{2}$  grain of codeine or  $\frac{1}{6}$  grain of heroin hydrochloride may suit some patients. Instead of resorting to subcutaneous injections of morphine we may give opium by the mouth; for this purpose a choice may be made from many preparations, such as Dover's powder, pill saponis, tincture of opium, or nepenthe. Omnopon is also a valuable preparation which may be given by the mouth in a dose of  $\frac{1}{6}$  to  $\frac{1}{3}$  of a grain.

In many physical diseases the toxæmia of infection is often responsible for insomnia rather than any concomitant pain. In many of these conditions opium or morphine is again the best remedy. Thus in pneumonia either opium in the form of Dover's powder or morphine can be given in the earlier stages, and usually up to the fourth or fifth day of the disease, with nothing but benefit. The chief contra-indication to their use is severe cyanosis. If morphine is given in the later stages of pneumonia, in chronic bronchitis or in broncho-pneumonia in elderly patients, it is always wiser to combine atropine with it; 1/100 of a grain of atropine may be combined with  $\frac{1}{4}$  of a grain of morphine. It is generally taught that paraldehyde is the safest hypnotic in pneumonia after the fourth or fifth day. To be effective, however, it must be given in a dose of not less than 2 drachms. Some caution is necessary in prescribing repeated or large doses of paraldehyde in the presence of much bronchitis, for its irritant action upon the bronchi during its excretion.

for a considerable time. Even when it is impossible to remove the anxiety responsible for insomnia the patients should be reassured about the common fears that the mere loss of sleep will of itself do them great harm. The general hygiene and habits of the individual must be studied. Daily exercise in the open air is to be encouraged, while actual physical fatigue should be avoided. Over-indulgence in tea, coffee, tobacco or alcohol are all common faults which must be remedied. All patients with insomnia, except of the slightest degree, are much better sleeping alone.

For sedentary workers and those who have acquired insomnia after a bout of unusually concentrated or prolonged mental work a short holiday in the country is often the most successful remedy, although this may need to be supplemented at first by the prescription of some mild hypnotic.

The great majority of the patients who seek advice for insomnia alone and in whom no definite physical cause appears to be operative have generally suffered for a long time before medical help is sought. Immediate relief is much to be desired, and for this reason some form of hypnotic drug is nearly always required. The prescription of hypnotics should always go hand in hand with the other measures already indicated, but it is both wrong and unkind to withhold them because the real cause of the insomnia has not been determined. In prescribing hypnotics the simplest and least depressant remedy compatible with success should always be chosen. In persons of temperate habits alcohol has certainly some hypnotic effect, but its habitual use for this purpose is entirely unjustified. Occasionally, however, in mild cases of insomnia a glass of stout or a small quantity of whisky, preferably taken with the evening meal, may be sufficient to induce a satisfactory sleep. Alcohol should never be recommended to neurotic patients or to sufferers from any form of anxiety neurosis. It should be a golden

rule to give in the first instance a dose of the hypnotic large enough to ensure a good sleep. The dose can easily be reduced later and the drug should always be stopped as soon as possible. The time of administration will naturally vary with the drug employed and the habits of the patient, but as a general rule hypnotics are best given just before bedtime. If possible the patient should not be told the nature or dose of the drug prescribed. Hence a soluble drug which can be prescribed in a mixture is generally preferable to a tablet or a powder. With a mixture also the dose can easily be diminished without the patient's knowledge by merely making up the quantity to the same volume with water. Once several good nights' rest have been obtained the patient may be allowed to leave the draught by his bedside with instructions to take it if he fails to secure sleep or if he wakes abnormally early. When patients are being treated at home without a nurse or some responsible relative in attendance, prescriptions for hypnotics should state the number of doses to be made up and should also be marked "Not to be repeated."

It will be of some service, perhaps, to consider briefly the types of hypnotics in common use and to note their particular characters and methods of employment. *Bromides* may be regarded as general sedatives rather than actual hypnotics, but they are often sufficient in slight cases. Even for this purpose they may be given with advantage in divided doses throughout the day, or they may be prescribed in a single large dose, e.g. 20 to 30 grains at night. *Chloral hydrate* is an old-fashioned hypnotic which is probably too little used nowadays. It is one particularly suitable for occasional use and in early cases, and its supposed dangers are, in the writer's opinion, much exaggerated. It acts rapidly, producing generally a quiet and prolonged sleep. It is best given in solution in a dose of 10 to 20 grains, and may often conveniently be

for a considerable time. Even when it is impossible to remove the anxiety responsible for insomnia the patients should be reassured about the common fears that the mere loss of sleep will of itself do them great harm. The general hygiene and habits of the individual must be studied. Daily exercise in the open air is to be encouraged, while actual physical fatigue should be avoided. Over-indulgence in tea, coffee, tobacco or alcohol are all common faults which must be remedied. All patients with insomnia, except of the slightest degree, are much better sleeping alone.

For sedentary workers and those who have acquired insomnia after a bout of unusually concentrated or prolonged mental work a short holiday in the country is often the most successful remedy, although this may need to be supplemented at first by the prescription of some mild hypnotic.

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and owing to its slow action should be taken three or four hours before bedtime. It is not suitable for prolonged administration, since very undesirable and sometimes dangerous cumulative effects may be produced. The first indication of quite serious poisonous results may be the rare, but well known, cherry-red coloration of the urine, due to the presence of a substance resembling hæmatoporphyrin. This sign should be taken as a danger signal and the drug stopped at once. Trional is free from these drawbacks, but is uncertain in its effects. Being more soluble, it can be given in solution in a dose of from 10 to 30 grains at bedtime.

Probably the most widely used group of hypnotics at the present time are those of the barbituric acid group. These comprise *veronal* or *barbitone*, *sodium veronal* or *medinal*, *luminal* and *sodium luminal*, *dial*, *adalín* and *bromural*. Regarded simply as hypnotics they are undoubtedly effective, for they are characterized as a whole by rapidity of action and freedom from unpleasant after-effects. Against them it is urged that they produce, when repeatedly used, definite poisonous effects, that they lead to addiction, and that they are often employed for suicidal purposes. Their poisonous properties are not often seen unless they are taken in excessive doses or their administration be unduly prolonged. Addiction to them does occur, with the production of a state of chronic poisoning shown by various nervous symptoms, such as nystagmus, ataxia, defective articulation, tremors, and eventually in some cases a serious degeneration of the moral character. In general they may be regarded as not only harmless, but exceedingly valuable for occasional use, but great caution should be exercised before allowing them to be taken for any long periods of time. When it is necessary to give them for more than a few days at a time, every effort should be made to keep the patient in ignorance of the exact preparation and dose employed,

prescriptions should therefore be marked "Not to be repeated" Caution is advised before using these compounds in cases of advanced cardiac disease or in patients with respiratory difficulties from such conditions as broncho-pneumonia.

Of all these compounds veronal itself is probably the most effective and the most risky. It is relatively insoluble, and is best given suspended in a little warm milk at bedtime. The official dose is 5 to 10 grams, but, in the opinion of the writer, it is seldom advisable to exceed a dose of 7 grains. Medinal or sodium veronal is certainly less toxic, is much more soluble and, therefore, more suitable for general use. The dose is from 5 to 10 grams, an average dose to begin with is 7 grains. In obstinate cases of insomnia 15 grains can be given with perfect safety. Indeed, it is nearly always a perfectly safe drug unless its administration be very prolonged, when it is capable of producing well-marked poisonous effects. Other preparations of the barbitone group are luminal, sodium luminal, adalin, bromural and soneryl. While luminal finds its principal use in the treatment of epilepsy it can be employed as a hypnotic in the milder forms of insomnia. For this purpose  $1\frac{1}{2}$  or at most 2 grains should be prescribed. Sodium luminal is more soluble and can, therefore, be given in solution; solutions, however, are unstable and must be freshly prepared. Bromural grs 5 to 10, adalin grs 5 to 10, and soneryl grs 1 to 2 are all useful in slighter cases.

It is impossible within the limits of a short article to consider the large number of proprietary hypnotic drugs which are constantly being placed upon the market. Nor is it desirable for the practitioner to prescribe new remedies with whose action he is unfamiliar. It is far better that he should acquaint himself thoroughly with the appropriate doses and peculiarities of a few reliable hypnotics. Amongst the barbituric acid derivatives the writer has found medinal

to be one of the most reliable

Other measures besides the general hygiene and the administration of hypnotics may be required in the more obstinate cases. General massage given with the patient in bed is sometimes of value. Hypnotic suggestion is always worth a trial and should be quite free from any harmful effects.

The treatment of insomnia in the psychoses may present great difficulties, since the continued administration of large doses of hypnotics is very undesirable. Hydrotherapy is sometimes successful when drugs fail; a hot wet pack may be given, and in the case of robust patients suffering from great excitement a cold pack. Among the hypnotics the bromides, chloral hydrate, medinal and paraldehyde afford a choice from which a successful remedy may be found for the milder cases. The general restlessness of many manic-depressive patients may sometimes be relieved by small doses of one of the barbitone derivatives given in divided doses throughout the day, e.g. medinal grs 2 to 3, thrice daily. Sulphonal is valuable in excited patients, but may have to be given in large doses, up to 30 or even 40 grams. As already mentioned it should not be continued for long on account of its poisonous cumulative properties. In elderly and enfeebled patients with arteriopathic dementia we must be careful to avoid depressant remedies. In such cases paraldehyde is usually safe and a mixture of the bromides and choralamide given with a little alcohol will often be found effective.

No apology should be necessary for the space devoted in this article to the use of hypnotics. To attempt to treat insomnia without drugs is an ideal seldom to be attained. The temporary success which they confer, however, must never lead to neglect a painstaking search for the causes of the insomnia and a wholehearted attempt to correct them by more natural methods.



# Minor Mental Disorders

By W RUSSELL BRAIN, M D , F R C P

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THE term minor mental disorders is here used to describe mental disturbances found in individuals who will never need or do not yet need treatment in a mental hospital. As a rule neurotic and hysterical individuals never require certification, there are other mental disorders in which no hard and fast line can be drawn between those within and those outside the mental hospital. Minor mental disorders thus include neuroses and the mild forms and early stages of psychoses.

*The anxiety reaction* —Anxiety may be defined as the association of fear with uncertainty. It is thus a little different from simple fear. For example, fear is the mental state evoked by being pursued by an escaped lion; anxiety is the emotion with which one anticipates the possibility that an escaped lion may be waiting round the corner. Pathological anxiety may be defined as anxiety for which no normal cause is apparent to consciousness. Anxiety may play a part in frankly psychotic states, for example, agitated depression. We will confine our attention, however, to neurotic anxiety, the state of mind of those anxious individuals who cannot explain the cause of their fear, but who are otherwise mentally normal. I need only mention in passing the familiar physical symptoms of anxiety. In well-marked cases the pupils are dilated, the tongue dry, the pulse rapid, the hands cold and tremulous, the tendon reflexes exaggerated. The victim finds concentration impossible, and sleep, which is uncertain, is apt to be disturbed by terrifying dreams.

It is important to recognize that, as no mental state is uncaused, there is always a cause for neurotic

anxiety and the patient is often indirectly aware of the cause, that is, he is aware of the source of his fear, though he does not recognize that it is the source. It is convenient to divide patients with neurotic anxiety into two groups (1) those suffering from focal anxiety, and (2) the constitutionally anxious. The focal causes of neurotic anxiety are exactly the same things which might justifiably cause some anxiety in normal individuals. Fear is intimately related to the instinct of self-preservation, but the "self" has several meanings. At the lowest level it is the bodily self, which is threatened by disease, pain and death. But man needs many accessories if he is to live and provide for his family in comfort, hence he possesses an economic self, which is liable to be threatened by financial and occupational anxiety. Further, from his earliest days he sees himself reflected in the opinion of others and compares himself with the standards offered by religion and morality. Here is his highest self, subject to the threats of social inadequacy, public disfavour and the sense of guilt. An anxiety reaction may develop out of a threat, real or imaginary, directed against either the bodily, the economic or the social self. Thus the source of the anxiety symptoms may be a fear of disease. Common examples of this are the fears of ill-health or mental breakdown resulting from masturbation, the fear of appendicitis and heart disease in the young adult, the fear of cancer and high blood-pressure in the middle-aged and elderly. Economic anxiety is at the root of traumatic neurasthenia and compensation neurosis. Marriage is perhaps the most difficult of social relationships, and the sexual life is a potent source of anxiety based upon a sense of inadequacy or of moral guilt.

Among those I have called the constitutionally anxious, it is not the threat which is serious, but the self which is vulnerable. Here we are dealing with individuals who from various causes, dating usually

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the hysterical symptom from a symptom due to an organic lesion, since the patient's idea of, let us say, paralysis does not coincide with the symptoms of a lesion of any part of the nervous system. The most important point about the hysterical symptom from the standpoint of treatment is its purposive character. For example, a daughter gives up her work against her will to look after an invalid mother. She then develops hysterical paralysis of the right arm. This prevents her from doing anything for her mother, and assistance has to be obtained to look after the two invalids. This patient is the victim of conflicting impulses. She wants to be at work, but she feels she owes a duty to her mother. Her paralysis saves her from an unpleasant duty, at the same time preserving her self-respect, for who can blame her for being ill? She solves her conflict, but at the expense of a hysterical symptom. Incidentally, she satisfies a prominent need of the hysterical temperament, the craving for sympathy. The conflict which is solved by a hysterical symptom is usually a moral conflict.

It follows that all attempts to deal with a hysterical symptom as a symptom are likely to fail, or if successful to be followed by relapse or by the appearance of another symptom. To remove the cause it is necessary to find out what difficulty has precipitated the illness. Since many of these difficulties are domestic, the general practitioner has opportunities of discovering them which are denied to the consultant and the out-patient medical officer. When the cause has been found the patient must be induced to deal with the difficulty without resorting to neurosis. When this stage has been reached, suggestion, persuasion and physico-therapeutic measures can be brought to bear upon the symptom with more hope of success. Why does the hysteric react to her troubles in this peculiar way? To explain this we seem driven to postulate a definite psycho-physiological predisposition. Even if

we cure an attack of hysteria the predisposition remains and many, though not all, of these patients remain fundamentally abnormal and liable to relapse.

*Depression.*—Depression is a symptom which differs fundamentally from anxiety in causation, prognosis and treatment. Most depressed patients are suffering from the condition which used to be known as manic-depressive psychosis and is now often called cyclothymia. Patients who conform to the textbook description of an individual alternating between depression and maniacal excitement are rare. In many cases excitement is absent; in others it is so slight that it is only detected by special inquiry. Depression is a mental state *sui generis*, which cannot be described in terms of anything else. Usually no cause for it can be discovered. As a rule it is associated with mental retardation. In milder cases this may be apparent only to the patient, who says, "My mind seems numb," or "My brain won't work." Insomnia and anorexia are usually present and there is generally some loss of weight.

Although the patient may be seen in his first attack, periodicity is a striking feature of the depressive state. There is often a history of one or more previous attacks of depression, which may have occurred years previously, which lasted a few weeks or months and passed away leaving no sequel. Although phases of marked excitability are uncommon in these milder cases, yet there is often a hint of them in the statement that the patient when well is "very lively" or "the life and soul of the party." The family history is often an aid to diagnosis, since cyclothymia is strongly hereditary and one often finds that other members of the family, perhaps in previous generations, have suffered from a mental illness severe enough to necessitate certification. Sufferers are usually of the short, broad, thick-set type. Depression being essentially cyclical tends to disappear spontaneously in time, though there is always a risk

of a further attack at some future date. The prognosis is worst at the menopause and in later life, but even then many patients recover. The great risk is suicide, and a large majority of individuals who commit suicide when suffering from "neurasthenia" are really victims of psychotic depression. It is usually wise to discuss this risk frankly with the patient, who will often welcome the opportunity of expressing his own fears of self-injury.

Treatment is directed to preventing suicide and promoting rest and sleep, for which purpose luminal is a valuable drug. Admission to a mental hospital is desirable only when the risk of suicide cannot be averted in any other way, or when the patient becomes so ill that special methods of feeding and nursing have to be adopted. Active psychotherapy is of little value, but understanding, reassurance and sympathy are helpful.

*Hypomania*—Mania is the opposite mental state to depression, with which it may alternate, as in the typical cyclical cases of manic-depressive psychosis. Instead of being depressed the maniacal patient is elated, and instead of exhibiting mental retardation he is facile and energetic and exhibits a rapidity of mental association which has received the name of "flight of ideas." We are not now concerned with severe cases of mania, but with milder degrees of the same disorder which may persist for weeks, months or years—chronic hypomania.

The most striking feature about the hypomanic patient is usually his extreme energy. He sleeps little, rises early before anyone else in the household is up and retires to bed late. If he is at work he lives in a positive fever of activity. He is voluble, genial and sociable. He is apt to appear to better advantage among strangers than at home, where he is usually irritable and gives way to fits of rage if he cannot get his own way. One such patient used to throw the dinner at the ceiling if it was not cooked to his liking.

the rôle of stresses, both physical and psychical, in etiology. In the worst cases, the disorder seems truly endogenous in that no cause for the breakdown can be discovered. Other schizophrenics collapse mentally in the face of comparatively mild difficulties, often connected with their occupations. In the third group an external cause is more obvious. An illness, pregnancy and the puerperium, or an unhappy love affair prove the precipitating factors. This point is of importance, for the more difficult it is to find an external cause for the breakdown the worse are the prospects of recovery. The more adequate the external cause, the better the outlook.

Although schizophrenia may not become fully apparent until perhaps the third decade of life, on looking back over the patient's history one often finds hints that his personality was abnormal at an early age. He has been shy and seclusive, and if not intellectually backward, emotionally immature. The father of one of my patients said of him "We always used to call him 'Peter Pan'." Occasionally, however, the child is for a time clever and successful beyond the average. When the breakdown comes it may take various forms and may develop insidiously or with startling suddenness. It is with the insidious cases that we are most concerned.

Usually the patient becomes quieter than normal. He refuses to go out and sits at home doing nothing. He develops odd habits. He smiles for no apparent reason and, when asked what he is smiling at, says, "Nothing." He may develop an interest in metaphysics or theosophy. All these slight changes give little indication of the upheaval beneath the surface, until suddenly he gives utterance to some bizarre delusion or carries out some abnormal action, which reveals even to his relations the true state of affairs.

To detect the early stages of schizophrenia, then, we should obtain a careful history of the patient's mental

development. We should look especially for alterations in temperament and for sudden impulsive changes of occupation, and should lay stress upon subjective disorders of feeling and mood. A loss of interest in life, a loss of normal affections, a feeling of emotional deadness or of the unreality of the external world are all significant symptoms, and we should look for mannerisms, little actions which are apparently meaningless, but which spring from the disordered mental life. The schizophrenic smile, once recognized, is unmistakable.

What treatment should we adopt for schizophrenia, and what are its prospects of success? When the breakdown appears to be purely endogenous less can be expected of treatment than when there is some definite external stress with which to deal. It is important to remove the patient from the surroundings in which the breakdown has occurred or is threatened. This does not necessarily mean sending him to a mental hospital, though this will be required in severe cases. Milder cases can be nursed satisfactorily at a nursing home, provided adequate skilled mental nursing is available. Isolation from relations and friends is essential. Sedatives are necessary in most cases and adequate sleep must be ensured. Luminal and medinal are the most useful drugs for this purpose. The nutrition of the patient must be maintained and an adequate supply of vitamins must be arranged. Psychotherapy in my experience has a definite, though limited, value in some cases. Where the cause of the breakdown is an obvious maladjustment, this can be explained to the patient when he begins to recover, and he can be helped to adjust himself to life more satisfactorily. Treated along these lines not a few patients will make satisfactory recoveries and return to play their part in social life, though they will always be liable to a similar breakdown at a later date, if life once again proves too difficult for them.



errors of metabolism secondary to over-alimentation, over-smoking and the excessive use of alcohol, also intestinal toxæmia and the various forms of focal sepsis.

The third group is exemplified by the hypertensive tendencies so frequent in women at or about the menopause, which may be assumed to be the outcome of an endocrine disturbance, incidentally it may be remarked that, though a temporary event in a certain proportion, the majority of these cases of menopausal high pressure are refractory to treatment and symptomatically progressive.

Apart, however, from the above groups of known etiological factors there are a considerable number of cases without any tangible explanation of the high-pressure syndrome, either in the shape of hereditary or acquired disease, in other words a wide and unexplored field still remains for solution, and extensive research will obviously be required before anything approaching a comprehensive conception of the high-pressure state can be promulgated.

*The symptomatology of hypertension* — Clinical evidence of the high blood-pressure syndrome is, as a rule, a subject of some complexity, for in the majority of cases the condition is merely one of the features of an underlying morbid process, the symptoms of which must invariably mingle with those for which the raised pressure is responsible. It therefore follows that patients' histories must be examined with considerable caution in order to differentiate and assess those specific phenomena which are definitely attributable to hypertension *per se* and the disordered circulatory mechanism which develops in its wake. For descriptive purposes it is convenient to separate the symptoms of raised pressure into two groups according to whether or not there may be evidence of a co-existing myocardial failure, and it is well to remember that the latter is by no means an essential complication, a large percentage

of cases showing no manifestations of its presence during the whole course of their malady

The symptomatology of high blood-pressure without cardiac failure can be expressed quite briefly in terms of cardiac over-action combined with an excessively vigorous circulation through the viscera. As a general rule patients complain of breathlessness, palpitations, flushings, throbbing sensations and varying degrees of discomfort in the chest, possibly even attacks of pain which are characteristically anginal in type, in an unselected series of cases 28 per cent of the patients complained of substernal effort pain as their most prominent symptom, and several of the remainder suffered from typical angina intercurrently with other discomforts of a more urgent character

Foremost among the latter occurred the so-called cerebral symptoms, a varied group of subjective disorders all indicative of disordered circulatory mechanism in the central nervous system, certain of these are the obvious equivalents of surcharged vascular channels, the more usual including giddiness, headache, sensations of fullness and throbbing in the head, tinnitus, insomnia, irritability, and emotional tendencies, added to these, moreover, are a series of symptoms which signify depression of nervous function and control, we may expect the latter in the fully developed and later stages of all the hypertension cases, the typical signs being lassitude, exhaustion, physical weakness, disinclination for exercise, fainting attacks, defective concentrating powers and a progressively failing memory, varying combinations of all these so-called cerebral symptoms are possible, and their relative significance cannot be assessed too carefully as furnishing valuable data in regard to prognosis and the effects of treatment, the former will, to some extent, depend upon the actual grade and general progress of the existing symptoms which may be singularly persistent in the more severe cases or sufficiently

heart failure in its fully declared form is one, therefore, of an extensive process involving numerous and varied manifestations in addition to those that are more strictly cardiac in type; the latter are often, in fact, singularly negative, but in a certain proportion of the cases there are noteworthy abnormalities, as for instance, a persistently fast heart action, impairment in the quality of the first heart sound, gallop rhythm, a drop in the blood pressure, and a diminished range of pulse pressure, each of which may be regarded as a valuable sign confirmatory of myocardial insufficiency, otherwise the large majority of symptoms and the outstanding clinical features of cardiac failure include a somewhat complex group of peripheral and visceral manifestations, all of which depend pathologically on the widespread venous stasis and the co-existing tendency to tissue oedema; beyond emphasizing, however, a potential involvement of all the various organs and systems it is unnecessary in the present context to detail the numerous phenomena which characterize their implication and consequent disfunction

Hypertensive heart failure may, however, run its entire course without any evidence of venous congestion or anasarca, and in these cases the prominent factor is pain frequently associated with an increasing degree of oppression in the chest and breathlessness which varies in grade proportionately with the reserve efficiency of the myocardium. The pain incidentally, though conforming to the typical anginal syndrome, may be somewhat peculiar in hypertension cases, very frequently its onset is spontaneous and unexplained, the patient either resting or possibly sleeping at the time of the seizure, in the majority of cases its area of distribution is extensive, involving the retro-sternal region and præcordium with radiation to the neck, and possibly to both arms, the attacks may persist for hours at a time, and are often associated with palpitation, paroxysmal breathlessness, and possibly pulmonary

oedema, though the acute pain may be completely relieved by treatment cutaneous hyperæsthesia may subsequently persist for varying periods of time (hours or days), especially following the more protracted seizures. As in the congestive so in the anginal group of hypertensive failure, examination of the cardiovascular system may be singularly negative except, of course, for the well-established signs of raised pressure, e.g. the forceful apex impulse, hypertrophy of the left ventricle, prolongation of the first heart sound, accentuation of the second sound at the aortic region.

There are certain additional physical signs which characterize anginal failure, cases sufficiently often to warrant special mention (1) Gallop rhythm—a particularly grave phenomenon which, having been definitely established, usually tends to persist. (2) Pulsus alternans—also a sign of serious moment recognizable at times by palpation of the radial pulse or preferably by auscultation over the brachial vessel during decompression of the sphygmomanometer from the level of maximum pressure (3) A diminishing range of pulse pressure, the systolic level remaining stationary, or possibly rising slightly, the diastolic level also increasing but to a proportionately greater extent.

#### TREATMENT

In approaching the question of rational treatment for high blood-pressure the following preliminary considerations are essential (1) That hypertension is itself only a symptom and that it occurs as such in large numbers of diseases of widely varying pathology (2) That the rational treatment of hypertension phenomena should in all cases involve consideration and, if possible, a definite diagnosis of the underlying disease (3) That in cases of doubtful etiology treatment cannot be other than palliative and symptomatic (4) That in a certain proportion of cases hypertension is compensatory and essential, and that active treatment

of the menopause the bromides appear to be distinctly valuable, and with them may be combined some one of the reliable calcium preparations, also tentatively a polyglandular or plain ovarian extract

An efficient daily bowel action must be ensured in all cases of hypertension, and for this purpose it may be necessary to revise the diet so that it shall include the correct proportion of fatty foods, fruit, vegetables and fluids, otherwise it may be advisable to prescribe a reliable aperient water as Hunyadi János, Friedrichshall, Kissingen, Rubinat, or laxative lithia, or, alternatively, some one of the vegetable laxatives as aloes, cascara sagrada, senna or rhubarb, and each of these may, if necessary, be supplemented by a daily dose of liquid paraffin, in addition, however, to the above, certain of the more actively depletive remedies, the cholagogue purgatives and the hydragogue cathartics, will, as a rule, be indicated in the majority of high tension cases, at intervals of about a week or a fortnight it may therefore be advisable for patients to take a mercurial pill at bedtime with a saline purge on the following morning

In its later stages hypertension may be associated with cardiac failure either congestive or anginal in type, the former should be treated on orthodox lines by rest, and such therapy as the embarrassed circulation may warrant, this will include the prescription of diuretics, such as digitalis, diuretin, euphyllin, or salyrgan, suitable purgatives as blue pill, calomel or colocynth with hyocyamus and other depletive remedies as, for instance, leeching, venesection (with inhalations of oxygen if dyspnoea is especially prominent), acupuncture and paracentesis abdominis, when œdema is persistent it may be advisable to restrict the fluid intake to an amount not exceeding two pints during the twenty-four hours and to try the effect of a salt-free diet, in the majority of cases restlessness and insomnia are troublesome features, for such a warm drink or a

stimulant narcotic (whisky or brandy) at bedtime may suffice, but these failing it will be necessary to administer some form of simple sedative, e.g. a bromide or chloral draught or chloralamide or mednal or paraldehyde or Dover's powder.

For the anginal type or high-tension failure potassium iodide (perhaps in combination with ammonium bromide) is found to be the most effective remedy, and it must as a rule be prescribed in large and gradually increasing dosage, the painful seizures may yield, and will usually be governed to some extent by the prescription of vascular relaxants (the nitrites, benzyl benzoate, erythrol tetranitrate) and diffusible stimulants as sal volatile or ether or brandy, but in obstinate cases it may be necessary to administer morphine and to apply counter irritants externally, or even to try the effect of a graduated course of diathermy. If, as frequently happens, the blood-pressure shows a tendency to rise during the failure stage a moderate venesection may be distinctly helpful, and this, with morphine, atropine or strophanthin, may prove to be a singularly successful remedy for the attacks of pulmonary oedema which may complicate the final stages of the malady.

pyelitis. The presence of organic disease may be declared by physical signs, such as enlargement of the kidney or its pelvis, dilatation and hypertrophy of the bladder, or enlargement of the prostate

Instrumental methods of radiography are particularly useful in the diagnosis of extra-renal albuminuria. Disease of the urethra, bladder or ureters may often be diagnosed with certainty by urethroscopy and cystoscopy. The condition of either or both ureters and kidneys can be separately determined by ureteric catheterization. X-ray examination may show a calculus, tuberculous disease, calcification in a neoplasm, or abnormal position or size of one or both kidneys. More recently intravenous pyelography has proved a valuable additional aid to diagnosis.

In extra-renal albuminuria the amount of albumin present is generally small, often only a trace. It may be the only obvious sign of organic disease, and the following examples are given to illustrate its importance. In the medical examination of large numbers of recruits during the war, or drafts of men for service afloat, the finding of a trace of albumin in the urine was a useful indication of the presence of a urethritis which in many cases would otherwise have been overlooked.

A woman, aged 57, suffered from general loss of health, bronchial catarrh, indigestion, anæmia and other symptoms. After a very detailed investigation, including X-ray examination of the chest and whole digestive tract, the only evidence of organic disease was the constant presence of a faint trace of albumin and an excess of leucocytes in the urinary deposit. The urine was sterile on culture. In the absence of any symptom of dysuria, and because the albumin was only a faint trace and the cells but little in excess of normal numbers, no clinical significance was attached to this finding. Six months later the patient had an attack of cystitis. This led to cystoscopy and the discovery of four papillomatous masses in the bladder. If the indication of organic disease provided by the slightly abnormal urinary examination had been followed up, the correct diagnosis would have been made six months sooner.

A man, aged 43, was seen on account of persistent albuminuria following a nervous breakdown seven months before. His general condition was good and the cardio-vascular system was normal.

The urine contained albumin, but no casts, crystals or cells in the deposit. There was no history of Bright's disease or symptoms suggestive of it. A history of passing a renal calculus 20 years ago pointed to the possibility of another calculus. X-ray examination showed a small calculus in the right ureter close to its opening into the bladder. This was confirmed by ureteric catheterization. A small brown calculus was removed by operation by Mr. Girling Ball. The patient made a good recovery and the urine became normal.

In most cases of extra-renal albuminuria urinary examination leads to other findings, such as bacilluria, pyuria, and hæmaturia. The character of the hæmaturia may indicate the site of bleeding, and the absence of casts, or the presence in rare cases of such extraneous elements as carcinoma cells and eggs of *Bilharzia hæmatobia*, are other urinary signs of the extra-renal origin of the albumin.

(2) *Renal Albuminuria* —(A) *Organic albuminuria*. The various forms of organic disease of the kidney will now be considered briefly and in general terms. In toxæmic kidney, which is due to bacterial and other toxæmias (febrile albuminuria is a common example of the condition), the kidney disease is conterminous with its cause. The condition is diagnosed in the presence of a sufficient cause for the albuminuria, especially if the urine is known to have been previously normal. The albuminuria is often accompanied by cylinduria, and there may be hæmaturia. A further reference is made to toxæmic kidney in the discussion of functional albuminuria.

Bright's disease is generally recognized by the presence of signs and symptoms of the disease in addition to albuminuria. Thus casts are found in the urinary deposit in all forms of Bright's disease at some stage in their course, except that there may be few or none in pure nephrosis. The presence of red and white blood corpuscles in the urinary deposit, or frank hæmaturia, is evidence of organic renal disease. There are cardio-vascular changes in most forms of nephritis, and the presence of retinitis may be diagnostic. The diagnosis of residual albuminuria is made when albumin



some evidence that it is due to obstruction of the blood-flow in the left renal vein produced by stretching and compression of the vein by the increased lumbar curve. It has been shown by ureteric catheterization that in some cases at least the albumin comes entirely from the left kidney. In other cases, when there is albumin in the urine from both kidneys, that from the left is in excess. James Russell, in October 1923, described two cases of unilateral œdema with albuminuria. In one of these the albuminuria was persistent, but an orthostatic or postural reaction was marked. There was no lordosis. When the patient stood for seven minutes leaning over towards the right the albuminuria was not increased. When she stood leaning over towards the left the urine became almost solid with albumin. Russell offered as an explanation of the association of albuminuria and unilateral œdema, an abnormal return of blood from the left lower limb through a persistent post-cardinal vein emptying into the left renal vein. The fact of albuminuria being intermittent, whether cyclic or orthostatic, is, however, no proof that it is functional. It is well known that minor degrees of nephritis, sometimes early in their onset and often late in convalescence, have intermittent albuminuria.

The kind of protein has been thought significant in the diagnosis of functional albuminuria. The protein may consist entirely of globulin, and characteristically there is more globulin than albumin. These features, however, are not pathognomic. In organic albuminuria there may be more globulin than albumin, and in a case of chronic nephritis, which afterwards came to post-mortem examination, the whole protein passed in the urine was globulin.

It will be seen, therefore, that the diagnosis of functional albuminuria cannot be made with certainty by the kind or quantity of protein in the urine, nor by the conditions affecting its presence. In general

terms, functional albuminuria is a condition of childhood and adolescence. It tends to disappear in adult life, and the diagnosis of functional albuminuria should not be made when albumin first appears in adult life.

The diagnosis is made by the exclusion of organic disease, particularly the absence of coincident cardiovascular disease, and the absence of excess of cells and casts in the urine. In doubtful cases renal function tests and chemical examination of the blood may help.

*Treatment of functional albuminuria.*—The subjects of functional albuminuria may be perfectly normal both in function and structure. In some healthy children and adolescents it seems to be attributable to their having overgrown their strength. Its association with lordosis has already been referred to. It is not uncommonly due to over-fatigue, as, for instance, in schoolboys who excel in work and games, and in consequence overtax their strength. In many cases, however, there are functional disturbances, especially vasomotor and nervous instability. Langdon Brown has described a group with cold, clammy, congested extremities and a large easily compressible pulse, and another group in which the subjects are spare, highly-strung and neurasthenic. Vasomotor instability may be shown by a tendency to fainting, tachycardia, and palpitations; there may be well-marked variations in blood-pressure from hour to hour or day to day, and posture may have a considerable influence in blood-pressure. Other cases present anæmia and defective nutrition.

These etiological factors indicate the general lines on which treatment should be based. When it is a case of the subject having outgrown his strength, sufficient rest must be ordered, particularly extra time lying horizontal in every 24 hours. For nervous instability care is taken to avoid too much mental activity and emotional strain; for lack or disorder of vasomotor control regular exercise is prescribed, and is given to general hygiene, including food,

digestion, clothing, and the like. Apart from these special indications for treatment, calcium lactate in doses of 10 grains thrice daily may be tried for a period.

Some cases of functional albuminuria belong really to the toxæmic kidney group, and are due to infected tonsils, dental sepsis, and similar conditions. Latent tuberculous infection—tuberculous mesenteric glands, for instance—may be the cause of slight albuminuria in a weedy youth. In fact, it is probable that many cases of simple functional albuminuria really belong to the group of toxæmic kidney, and in the treatment of the condition this aspect of the case must receive careful attention.

When a boy with functional albuminuria, but otherwise healthy, goes to a public school he should be allowed to play games and live the ordinary school life. Some little extra care should be taken to protect him against exposure to cold; it will probably be enough to see that he has good underclothing. He should be under the observation of the school medical officer, who will observe whether the boy gets over-tired after exercise, and whether games have any marked effect on the albuminuria. Very strenuous exercise, such as racing and long-distance running, are best avoided at first. But if, after observation for a few terms, the boy's health is obviously good, all restrictions can be withdrawn, except that in the case of an intercurrent infection, such as tonsillitis or influenza, the urine should be examined both for albumin and casts. The kidneys' reaction to infection may throw some light on whether the case is really one of functional albuminuria or latent chronic nephritis. Fortunately for many boys and girls their functional albuminuria is undiscovered. There must, indeed, be many conditions of which we are at present ignorant that are responsible for slight and harmless albuminuria, for it has been found by several observers that, in the routine examination of hundreds of apparently healthy adults, in about 5 per cent. there is a slight albuminuria.

# Cystitis

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CYSTITIS is a common condition, typically implying the frequent and painful passage of pus-containing urine. If there is no pus in the urine, there is no cystitis. Therefore, before diagnosing it, the presence of pus must be proved. Such physical and chemical tests as the boiling test for albumin and the potassium hydroxide test for pus are crude, and may be negative when pus is discoverable microscopically; nor, if the former is positive, is anything proved as to the presence of pus, as the albumin may be present in other forms. It is true that, with a white deposit in alkaline urine, the addition of acetic acid will distinguish phosphates from pus, by dissolving the former, but it must be emphasized that the only test which always enables one to say that pus is or is not present is the microscopic presence or absence of pus cells. In the milder forms of cystitis pain may be negligible or absent. Therefore the presence of pyuria is an essential feature in the differential diagnosis of cystitis from those numerous other conditions in which increased frequency of micturition is present—as, for instance, owing to the polyuria of diabetes mellitus and insipidus, chronic interstitial nephritis and hysteria, in cases of oxaluria and phosphaturia, and when the prostate is “enlarged.”

In distinguishing from the pyuria of cystitis that in which the pus is derived from below the bladder (as in urethritis, prostatitis, vesiculitis), one notes the history of exposure to the risk of contracting venereal disease, redness or œdema of the external urethral meatus, and the presence of a urethral discharge and of prostatic or vesicular tenderness on rectal examination. Gonococcal cystitis is said to be rare, the many-layered

transitional bladder epithelium presumably offering greater resistance to the inroads of the gonococcus than the more delicate columnar epithelium of the urethra. But it is difficult to see how certainty on this question can be reached, since cystoscopy is contra-indicated in urethritis, and since the symptoms of cystitis are closely simulated by inflammation of the adjacent prostate and posterior urethra which are involved in a large proportion of cases of urethritis. And, in any case, the question is of rather academic interest, since treatment is primarily directed to the urethritis.

In excluding the bladder as the source of pus, the two- or three-glass test is useful. If, while urine passed into the first glass is purulent, that passed into the second is clear, cystitis is absent; if also purulent, it is not equally certain that cystitis is present. The source of pus from a chronically inflamed prostate or vesicle can be shown, after massage of these regions per rectum, if, when the urine passed into the second glass is clear, the remaining urine, passed into yet a third glass, after massage, contains pus; or if, though the second glass contains a little pus, the third shows considerably more. It will thus be seen that, in the presence of inflammation of the urethra and its offshoots, it is easier to affirm the absence, than the co-existence, of cystitis. As already mentioned, such co-existence, difficult to diagnose, is therapeutically subsidiary. For the purposes of this article, we are considering, not urethritis, but pyuria in which the pus is already contained in the urine as it leaves the bladder, where it has originated. This implies that cystitis is to be distinguished from all those renal conditions (pyelitis, pyelonephritis, pyonephrosis, renal calculus, and renal tuberculosis) in which pus is discharged into the bladder. While the two may co-exist, so that, for instance, we have a condition of pyelocystitis, the contrary is, perhaps, more often the case.

The pus from a pyonephrosis, or organisms alone, as in bacilluria, may pass through a bladder without causing cystitis. Organisms have also been experimentally introduced into the bladder from below, with similar failure to cause cystitis

It is this resistance to infection of the healthy bladder (and only a healthy bladder can be so treated with impunity) which allows of posterior irrigations into it in cases of chronic urethritis, for, though antiseptic solutions are employed, these are necessarily weak, and probably act mainly by mechanical flushing away of infective discharges. The important thing to realize is that, for cystitis to occur, something more is necessary than the arrival of organisms into the bladder. Thomson-Walker says "If bacteria reach the healthy bladder by the urethra or through the kidneys, cystitis is not produced in the majority of cases. Urine which is swarming with bacteria may be passed through the bladder for years without producing cystitis."

Thus the predisposing causes of cystitis are of decisive importance in determining its onset. The most important of these are . (1) stagnation of urine in the bladder, (2) injury of the bladder; (3) congestion of the bladder. Taking the last-named first, we may instance sexual and alcoholic excess and exposure to cold as favouring congestion of the bladder; also, perhaps, some mysterious individual predisposition by which, as Romanis and Mitchiner well say: "There are some people who appear to take cold in their bladders rather than in their nose or throat."

So important are these predisposing causes of cystitis, in the absence of which the organisms seem powerless to produce it, that one is tempted to reverse current opinion, and regard, not the organism, but rather the so-called predisposing cause, as the exciting one, thus agreeing with the popular phraseology of those who, knowing nothing of organisms, perhaps rightly attribute their ills to "catching a chill," or sitting in a

draught or on a cold stone The truth, it would seem, is that the terms "predisposing" and "exciting" causes are relative and interchangeable; both are necessary to the production of cystitis or any other inflammation. Since, however, the organisms which may cause rhinitis are constantly present in the nose, and since the organisms which cause cystitis may be present for years in the bladder, without causing inflammation until the so-called predisposing cause acts, it does seem as if the term "exciting cause" should apply to the final event which pulls the trigger (e g sitting in a draught or on a cold stone) rather than to the previously present, but harmless, bullet—the organism.

The rarity, with correct technique, of cystitis caused by urethral instrumentation is well shown by figures assembled by Cairns who, in a period of five years at the London Hospital, could find no certain case of cystitis ascribable to infection at cystoscopy He naïvely says "We admit that our technique is good, but we do not flatter ourselves that, during this period in which over 3,000 cystoscopies have been performed, we have been able in every case to prevent bacterial infection of the bladder It is, therefore, clear that in addition to bacterial infection some other factor is necessary for the production of cystitis" In thus laying stress on the inadequacy of organisms, unaided by other factors, to produce inflammation, it is not desired to belittle the need for asepsis in urethral instrumentation, but rather to emphasize the still greater importance of avoiding trauma of the urethra or of the bladder neck or walls—an importance well illustrated in the dictum of Keyes that "The cleaner you are the better, but the gentler you are the best"

As a special variety, one may here mention the "cystitis of marriage" and "honeymoon pyelitis" as arising from an unaccustomed combination of some of these causal factors, such as pelvic congestion, together

with trauma in the form of minute abrasions permitting the absorption of organisms, with predisposition, uncleanness, roughness and excess (any or all of these) as probable abettors. Recently I saw at the West London Hospital a woman of 21 who, within a month of marriage, was suffering from an already resolving cystitis, which was cystoscopically confirmed. An elder sister had similarly suffered on marriage.

Other varieties of damage to the vesical epithelium leading to cystitis are provided by a stone or by a foreign body in the bladder (the rougher these are, the greater the risk of cystitis), while both, especially the former may also predispose to cystitis by temporarily obstructing the outflow of urine. The increased frequency, like the other symptoms, caused by a stone, is mainly noticeable by day, that due to enlarged prostate, by night. In both conditions, once cystitis has set in, increased frequency occurs both by day and by night, and the cystitis itself favours secondary stone formation. A special type of damage to the bladder epithelium, by leading to its necrosis, is caused by a malignant neoplasm. Whereas an ordinary papilloma of the bladder is found with clear urine, a carcinoma soon ulcerates, becomes coated with phosphates, and often masquerades as a cystitis, with exceptionally offensive urine. Since a bladder growth may co-exist with urethral stricture, a foul cystitis persisting after full dilatation of the stricture calls, like any other cystitis persisting unduly, for cystoscopy.

As an obvious cause of damage to the bladder may also be mentioned cystotomy. But here, as the trauma is single and aseptic, and the bladder closed at the same sitting, cystitis is not clinically noticeable, especially since bladder drainage by catheter usually follows. With cystostomy, in which the damaged area is kept open, allowing more opportunities for the entry of organisms, there is a greater risk of infection. b. drainage is simultaneously provided (the



associated with an acid sterile pyuria in a young adult, should make one think of renal tuberculosis, of which it is the earliest symptom. The urine is also acid in cystitis caused by the *Bacillus coli* or the gonococcus. An alkaline cystitis may be due to staphylococci and streptococci and *B. proteus*. The increased frequency of renal tuberculosis exists, as proved by cystoscopy, apart from any visible involvement of the bladder, and is ascribable to a reflex, that is to say, that the kidney and bladder partially sharing a common segmental innervation, sensations are referred from a normally silent organ (the kidney) to one (the bladder) which is physiologically vocal in giving rise to sensory impressions.

Renal tuberculosis is a good example of the fact that increased frequency of micturition, which, when pyuria co-exists, is generally regarded as a symptom of cystitis or, at any rate, an affection of the bladder and its neighbourhood, may be due to a purely renal lesion. Though a feature of renal tuberculosis, increased frequency of micturition may also be found in ordinary non-tuberculous pyelitis. Other ways, besides reflex action, in which an affection of the kidney may be supposed to cause increased frequency of micturition, are by the irritating character of the urine, by the polyuria often associated with an early renal lesion, and by involvement of the ureteric orifice, which, while the rest of the bladder appears healthy, may, in pyelitis, be pink and puffy.

Fever is an important sign in distinguishing pyelitis from cystitis. Fever with pyuria points to pyelitis or prostatitis rather than to cystitis. Just as primary tuberculous cystitis is very rare, so is any primary cystitis rare. One must cultivate the attitude that cystitis does not occur without some cause, for which one must search, and which must, if possible, be eliminated. In this search the following paths of inquiry are prominent. The history may give impor-

tant clues For instance, it may suggest the possibility of a urethral stricture, or of kidney trouble, originating, perhaps, during pregnancy, of pelvic disturbances, or of the recent passage of an instrument into the bladder.

Clinical examination, of course, is also important Tenderness may be felt over a kidney, the seat of pyelitis, calculus, or tuberculosis, a lump in pyonephrosis, hypogastric tenderness in cystitis Absent knee-jerks and inactive pupils are suggestive. Vulvo-vaginitis or a cystocele may be found On rectal examination one may feel an enlarged prostate or a bladder growth

Not long ago a curious clue was furnished by an apparently double external urethral meatus in a female aged 31, complaining of pain on passing water which was purulent There was hourly frequency of micturition Cystoscopy showed a large stone, and the cystoscope, on being withdrawn from the anterior orifice and passed through the posterior one, was visible through the former, the two being separated merely by a superficial bridge of tissue A bladder stone in a female is unusual, and raises the question of a foreign body as a nucleus In this case the double urethral meatus strengthened the suspicion of trauma by a foreign body On being questioned, the patient admitted having attempted to produce abortion with a piece of slippery elm, and this was afterwards found inside the stone She had been treated for months for "cystitis," by means of copious fluids and bladder-washes

Examination of the urine, while proving the presence of pus (indispensable for a diagnosis of cystitis) may reveal tubercle bacilli, which should be looked for even in the obvious presence of other organisms, since these may represent a secondary infection Occasionally bilharzial ova may be found, when there will be a history of residence in certain countries, especially Egypt, and yellow nodules will be seen on cystoscopy

Radiography is of prime importance in the diagnosis of renal and ureteric calculi, and also reveals calcifications in old tuberculous kidneys, and even of the bladder itself in cases of encrusted cystitis In combination with pyelo-uretero-cystography, both by the older urethral, and by the newer intravenous route, radiography is of very great help in the elucidation of foci

of urinary infection which may be keeping up cystitis.

But cystoscopy, though it may be rendered impossible by a urethral stricture or enlarged prostate, is perhaps the most useful of all methods of investigation in such cases. Besides confirming the diagnosis of cystitis, it often finds its cause, as by discovering residual urine, a stone or foreign body in the bladder, an intravesical projection of the prostate, bladder sacculi or diverticula, vesical tuberculosis or neoplasm, evidence of pyelitis or pyonephrosis, or the restriction of the inflammatory process to a particular part of the bladder, as in trigonitis, frequently associated with female pelvic trouble.

#### TREATMENT

With regard to treatment, in acute cystitis the patient should be in bed, kept on very light diet, and made to drink large quantities of water or barley water. Heat to the hypogastrium and hot hip-baths afford comfort, while bladder symptoms are relieved by alkalis and hyoscyamus. No instrument should be passed into the bladder. Occasionally, as in acute hæmorrhagic cystitis with clot retention, cystostomy is required.

In a study of 28 cases of catheter cystitis, Dukes found that "Neither hexyl-resorcinol, hexamine, nor methylene blue has any curative effect on these infections," but that "alkaline treatment is followed by a rapid amelioration of symptoms," even though "to make the urine alkaline does not make it antiseptic." His conclusions were given in a joint discussion on urinary antiseptics by the Sections of Urology, Pathology, and Therapeutics and Pharmacology of the Royal Society of Medicine, and the whole discussion is well worthy of study by enthusiasts on the subject of urinary antiseptics, whose opinions it should serve to modify.

In chronic cystitis it is usual to give hexamine. If

so, it should be given before meals, to avoid its irritating effect on the stomach, and the urine should be acid, acid sodium phosphate, if necessary, being given after meals. To produce its maximum effect, a urinary antiseptic should be concentrated by withholding drinks. These, however, are very valuable in washing away infective products, and their obvious value in this direction may be held to outweigh the problematical value of urinary antiseptics. But the main point on which too much emphasis cannot be laid is that chronic cystitis calls for investigation, especially by cystoscopy, in order, if possible, to discover factors responsible for its continuance. The removal of these factors will be followed by the disappearance or, if they have acted too long, by the improvement, of the cystitis.

The treatment of cystitis, then, may involve that of urethral stricture or enlarged prostate, of bladder-stones, growths, and diverticula, of cystocele, and of various renal lesions, whether by nephrectomy, as in tuberculosis, or, as in pyelitis, by attention to the condition of the bowel, the appendix being sometimes the source of the absorbed organisms. Where the responsible factors cannot be removed, as, for instance, in cases of sacculated bladder, or where there is residual urine, but operation is contra-indicated, or where pre-operative abatement of cystitis is intended, bladder irrigations are valuable, the catheter being tied in, if the patient is in bed, and thus affording the additional advantage of continuous drainage. The way in which residual urine acts by affording material for constant re-infection of the bladder is shown by the increasingly purulent appearance of the last portion of urine drawn off, the pus settling down to the bottom of the bladder, and never getting properly voided.

The problem of cystitis can be best summed up in the words of Langdon Brown, who, in introducing the discussion referred to, said that: "All urinary infections which do not improve quickly under ordinary medical

measures should be examined by the cystoscope and ureteric catheter for mechanical difficulties and for evidence of tuberculosis, which may be the primary cause of various secondary infections." The magically satisfying word cystitis has too long been a sort of urological Cinderella or diagnostic maid-of-all-work. In directing attention away from bacteria, and in emphasizing here *ad nauseam* the importance of the so-called predisposing causes of cystitis, it is wished to enforce two points. The first is that, for practical purposes, cystitis (including tuberculous cystitis) will, as a rule and if not of too long standing, resolve unless there is some special factor maintaining it, such as constant re-infection from the kidney or the presence of residual urine in the bladder. The second, which follows from the first, is that, rather than pin his faith to urinary antiseptics (which, each in turn, arise and fade like will-o'-the-wisps on the therapeutic horizon), it is the duty of the practitioner, in every case of cystitis not rapidly resolving, to search by all possible means for causes preventing resolution. Such means include clinical examination, microscopical and bacteriological investigation of the urine, radiography of the urinary tract, inquiry by catheter for the presence of residual urine, cystoscopy, ureteric catheterization, and pyelography. After the elimination of factors maintaining cystitis, it will usually clear up as certainly as it spontaneously does in their absence, and that, without the help of urinary antiseptics; whereas oceans of these will not abate cystitis until such predisposing factors are removed.

#### CONCLUSIONS

Organisms alone do not cause cystitis in the absence of predisposing causes, the most important of which are stagnation of urine in the bladder, and injury and congestion of the bladder. Primary cystitis is rare, the bladder condition being often secondary to a renal

lesion Any cystitis not rapidly resolving must be thoroughly investigated, especially by the cystoscope, for the presence of stone, foreign body, intravesical projection of the prostate, sacculi and diverticula, tuberculosis, neoplasm, or for evidence of pyelitis or pyonephrosis Treatment must be directed to these factors, not merely to the associated cystitis Alkalis relieve acute symptoms, but copious fluids are more important than urinary antiseptics

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# The Modern Treatment of Varicose Veins

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THERE can be no doubt that, provided there are not any contra-indications present, varicose veins are best treated by injection in preference to the old method of operation which necessitated the removal of all the visible and palpable subcutaneous veins in the lower limb through one or more incisions, this being a slow and tedious undertaking and unsuitable for advanced cases. The disadvantages, too, of operation, involving an anæsthetic, invalidism, and consequent loss of time and money, the possibility of attendant sepsis and pulmonary embolism, are avoided, as the injection treatment can be carried out in a consulting room or private house, causing neither break in the patient's ordinary daily routine nor his lying up, even for a short period. The likelihood of recurrence, often seen even after the most thorough operation, is also negligible where the injection treatment is concerned, and patients are highly gratified by the simplicity, painlessness, and permanent results.

The injection treatment, although over 100 years old, only came to the fore during the Great War, and then largely through the efforts of Sicard, Gaugier, Forestier and Génévrier in France, where their technique and the solutions used were superior to those previously employed. The first mention of the treatment in British journals was by Dunbar in 1925, followed in 1926 by Alexander's and Douthwaite's accounts of their successful experiences with the treatment. Many varicose vein clinics now exist all over the country, and many general practitioners have enthusiastically adopted the treatment, testifying to its increasing

success and popularity

The object of the injection treatment is to introduce into a varicose vein a sclerosing solution of sufficient quantity and strength to produce chemical injury or irritation in the endothelium, this being followed by clotting and obliteration of the vein. The artificially formed thrombus is rapidly organized and adheres firmly to the vein wall. An extensive, aseptic, inflammatory process takes place in the clot, which becomes permeated with fibroblasts and minute young blood vessels, and is eventually converted into a mass of fibrous tissue, leading to shrinkage and gradual obliteration of the vein, in the place of which small, attenuated, hard cords are formed. Owing to their resistance to corrosive agents, the sclerosing solution has little or no effect on normal veins. Demonstrations show clearly that when the patient stands erect, the circulation in a varicose vein is towards the periphery, making the risks of pulmonary embolism and infarction due to the injection very remote.

#### SOLUTIONS FOR INJECTION

Practically any chemical solution injected into a varicose vein will produce some degree of thrombosis. I have myself tried over a hundred of the vast number of solutions employed at one time and another, but it can certainly be stated that the ideal solution has not, as yet, been found. The qualities which an ideal solution should possess are that it should be cheap and easily dispensed; it should be stable, should preserve its original form for an indefinite period, and not undergo any decomposition through physical agents; it should be colourless, non-toxic, and in itself sterile and antiseptic, it should produce a maximum amount of sclerosis with a minimum amount of local or constitutional disturbance, and if by error or mischance injected into the subcutaneous tissues it should not produce an injection ulcer—the bugbear of the treat-



ment The most generally popular solutions in use at the present moment are —

(1) *Lithium salicylate* 30 per cent, *tutocaine* 1 per cent (*lithocaine*)—This, in my opinion, is the best solution, and can be recommended for the majority of cases It has been in constant use at the Royal Waterloo Hospital Varicose Vein Clinic since 1926, and is freshly prepared for use each week. If kept for longer than two or three weeks discoloration sets in, due to the combination of the lithium salicylate with the iron present in the glass of the vessel. Messrs. Crookes, however, put up the lithocaine in ampoules made of iron-free glass, in which it will keep for over a year. It is pale straw coloured, non-toxic, painless when injected owing to the presence of tutocaine, and as a sclerosing solution is unsurpassed If injected subcutaneously it will produce necrosis of the tissues The usual dose is 4 c cm, but this will vary with the extent of the varicosities, it is unwise to inject more than 8 c cm or less than 2 c cm into one limb. The resulting clot is very firm, hard and extensive, with a minimum amount of local reaction

(2) *Quinine hydrochloride* (B P) 4 grams, *urethane* 2 grams, *distilled water* 30 c cm—This is G  n  vrier's solution, and has many advocates, including Douthwaite It is a stable, colourless solution, and keeps indefinitely; as the quinine tends to crystallize out of solution it is necessary to boil it before use The dose varies from  $\frac{1}{2}$ –2 c.cm, but not more than 3 c cm should ever be injected at one time Test for idiosyncrasy may be previously made, either by giving the patient a small injection (say,  $\frac{1}{4}$  c cm), or by placing one drop of 1 per cent quinine hydrochloride solution on the patient's forearm, and scarifying the skin under it, sterile water being used as a control Where sensitiveness exists a definite wheal, surrounded by a zone of erythema, appears about ten minutes later Quinine-urethane injection is painless, and the sclerosis is

usually extensive and satisfactory. It has, however, the following disadvantages. (a) Cinchonism. Some patients, although unaffected by small doses of quinine, will, on being given the larger amounts, show alarming symptoms of cinchonism. (b) In approximately 10 per cent. of cases the injection of quinine will produce nausea, giddiness, fainting, buzziness in the head, and cramp-like abdominal pains, if more than 3 c cm is injected some patients will actually faint, develop skin rashes, or present severe symptoms of collapse from which they may take a considerable time to revive. (c) Quinine is a well-known abortifacient, and should not be employed in patients suspected of being pregnant, or even in those who are menstruating; it will sometimes produce menorrhagia and uterine colic. (d) If injected subcutaneously it will, like most solutions now in use, produce an injection ulcer which is indolent and takes many weeks to heal.

(3) *Salt solution*—This is composed of 20 per cent. sodium chloride, to which has been added 1 per cent. tutocaine. Provided the needle can be introduced into the small, apparently intradermal veins which sometimes occur, this solution is ideal for such, but has practically no effect on large veins. Strong solutions, too, are unsuitable for these small veins, often causing intense pain, aseptic inflammation of the subcutaneous skin, and sometimes sloughing of the vein coursed.

(4) *Sodium morrhuate*—Sodium morrhuate is a soap, being the sodium salt of a fatty acid extracted by saponification from cod-liver oil, and is dispensed in 5 per cent and 10 per cent strengths, 0.5 per cent phenol being added as a preservative. Although the 5 per cent. solution is the one of choice, the 10 per cent is required for obstinate or advanced cases. The dose varies from  $\frac{1}{2}$ –1 c.cm at intervals of three to four inches for average cases, and 5–10 c cm as a maximum at one sitting where a stronger dose is required. If injected subcutaneously this solution seldom produces

an ulcer. Many injections being possible at one time, the total number of sittings necessary will be materially reduced, and two or three will usually complete the treatment. In spite of its advantages, however, my experience of the solution has been mainly disappointing as regards end-results, 30 per cent. of cases showing some degree of recanalization. The development of urticaria after an injection in 5 per cent. of cases, while causing no permanent damage, is naturally disquieting at the time. The pale yellow-coloured solutions are preferable to the darker, the latter making it difficult to see if the blood has been withdrawn into the syringe prior to injection.

(5) *The "twin injection"*—Certain large tortuous veins are very difficult to sclerose, even where massive doses of quinine-urethane, lithocaine, or sodium morrhuate have been given. Such cases treated by the "twin injection" are, however, invariably satisfactory, and there is no vein so large, no varicose condition so extensive, that cannot eventually be made to yield good final results by this method. Quinine-urethane 2 c cm. and lithium salicylate 4 c cm. are injected from two separate syringes simultaneously at a distance of two to four inches in the same vein. The two solutions are incompatible, and when mixed together produce a white, stringy, glutinous precipitate which adheres to the vein wall, and in all cases produces a very firm, extensive and satisfactory thrombus. The "twin injection" cannot be given single-handed.

#### TECHNIQUE

Before undertaking the injection treatment, patients should be completely overhauled, special attention being given to the cardio-vascular system, the liver, kidneys, pelvic organs and areas of focal sepsis. The urine should always be examined, as any evidence of diabetes or nephritis would at once place a bar on the treatment. Age is no contra-indication, as the injection treatment has been successfully practised in the

young and in the very aged.

It is of the utmost importance that *both* lower limbs be carefully examined, even if the varicose veins are limited to only one portion of a leg. The operator should also make quite sure that it is actually a case of varicose veins, and not merely one in which normal veins are unduly prominent through wasting of the limb or lack of subcutaneous tissue.

(1) *Syringe*.—No special syringe is required for the treatment, although many varieties are on the market. I recommend a 5 c.cm. Record syringe; it can be sterilized by keeping it in surgical spirit, and rinsing it thoroughly in water before use. An ordinary hypodermic needle, No 15 or 16, is preferable to the small and specially constructed ones often advocated.

(2) *Amount to be injected at each sitting*.—If quinine-urethane is used, not more than  $\frac{1}{4}$ – $\frac{1}{2}$  c cm should be injected at the first sitting, subsequently 1–2 c.cm. may be used, either at one or more points in the vein, the total amount not to exceed 3 c.cm. Slight cases will require few sittings, severe cases five, or even six. With lithium salicylate the average case receives 4 c cm. at weekly intervals. If sodium morrhuate is used five to ten injections of  $\frac{1}{2}$ –1 c cm may be given. It is useless to inject less than 4 c.cm. of salt solution, the usual dose being 5–10 c cm.

(3) *Position of the patient*.—When the injection is to be given on the anterior aspects of the thigh or leg, the patient may be seated with the foot supported on a low stool. If the veins are situated posteriorly, the patient may either stand or lie supine. Where the veins are very large, the injections should be given with the patient prone on a couch, so that the veins may be as collapsed as possible, and the maximum area of the vein wall be affected by the sclerosing solution. The patient should not stand erect on a stool, as, if he faints, he may injure himself with his fall.

(4) *Tourniquet*.—A tourniquet is only necessary

the worse is the necrosis, varying from redness and blistering of the skin to a dark gangrenous patch which is resistant to treatment and eventually leaves a depressed, discoloured, unsightly scar.

(b) *Cellulitis*.—This must be distinguished from chemical peri- and extra-venitis, resulting from too strong a solution, and is due to lack of aseptic care during injection. Abscess formation, which is rare, is obviously due to faulty technique or selection of cases.

(c) *Pulmonary embolism and infarction*.—As previously stated, the risk of such complications is negligible provided due care is exercised in the selection of cases. In the 25,000 injections I have given since 1926, I have only experienced one such case, and at the Royal Waterloo Hospital, where over 3,000 injections are given yearly, there has been no known case since the clinic started in 1926.

#### CONCLUSIONS

The injection treatment, although simple and efficacious, cannot be learned from books, and five or six visits to a well-equipped clinic are advisable before undertaking it. Some 80 per cent of cases may present no difficulties, but for the remainder, where early deep thrombosis or incipient phlebitis may lie hidden, special trained knowledge is essential.

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# The Modern Treatment of Burns and Scalds

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IN recent years there have been signs of a widespread and increasing interest in the subject of burns and scalds. While attention has been directed mainly to the practical aspect of the subject, questions of theoretical importance have not escaped notice, nor has controversy been lacking. There is almost universal agreement that the modern treatment of these injuries is attended with much more success than was that of ten years ago, and only a few deny that the change is a result of therapeutic advances. In this article are given a brief but essential consideration of the clinical and pathological features of burns, and a description of present methods of treatment. The method of treatment described is that of tannic acid, introduced by Davidson,<sup>1</sup> and the account is based on experience of its use in more than 200 cases during the past six years. The majority of the cases were children under 12 years, and in a large proportion the injuries resulted from scalding.

## CLINICAL AND PATHOLOGICAL FEATURES

In a previous publication the clinical course of burns was described as being divided into the following four stages: (1) of shock; (2) of acute toxæmia, (3) of septic toxæmia, and (4) of healing. It is convenient to discuss separately each stage in regard to clinical features, pathology, principles of treatment, and results of treatment.

*Stage 1 Stage of shock*—No lengthy description of the clinical features of shock is required here. The

condition appears immediately or very soon after receipt of the injury, and is one of depression of all the vital functions. The outstanding characteristic is a fall of blood-pressure. The pathology of shock, in spite of the most prolonged and laborious investigation, is still a subject of debate. A close similarity, however, has been demonstrated between shock arising after burns and the "initial shock" of other injuries, such as war wounds, and there is much to support the view that both are due to a vasomotor disturbance.

Several facts relating to shock in burns demand special emphasis. Shock, however caused, is accentuated by pain, exposure to cold, and loss of fluid from the body. A low blood-pressure, if prolonged, can cause irreparable damage to delicate tissues, such as the central nervous system. In "initial shock" the effective blood volume is very probably diminished. The indications for treatment are, therefore, clearly to administer heat and avoid exposure, to relieve pain, to supply fluids, and to restore the normal level of blood-pressure. Experience has shown that the most effective method of raising the blood-pressure is to introduce into the circulation a colloidal solution of correct concentration, such as blood or gum saline. In burns the degree of shock bears a very close relationship to the extent of body surface involved. The extent may be described as "small" for burns of 10 per cent or less of the body surface, as "moderate" for those between 10 and 30 per cent, as "extensive" for those between 30 and 50 per cent, and "very extensive" for those of more than half the body surface. Shock is invariably marked in very extensive burns, and usually severe in extensive burns. In burns of moderate extent it is variable in degree and rarely dangerous. In small lesions it is exceptional.

Shock of moderate or mild degrees can be easily combated by treatment based upon the principles mentioned before. A severe degree of shock is a very

dangerous condition Unless great care is taken, shock can easily be aggravated by ill-chosen procedures in local treatment, and if it has persisted for any time, it resists all known methods of therapy Cases with very severe shock may die within a few hours of injury Others make a partial recovery, but succumb ultimately after a period of circulatory depression lasting for 24 to 72 hours Usually in the interval the temperature has risen, the appearance of apathy has given way to one of anxiety and restlessness, and vomiting has occurred The cause of death is not easily determined, and in such cases death is usually ascribed to "shock" The factors which perpetuate the low level of blood-pressure are not thoroughly understood, but there are excellent reasons for believing that from several hours after injury toxic substances have been absorbed from the burned area It might therefore be more accurate to state that death in such circumstances is due to acute toxæmia following upon severe shock

*Stage 2 Stage of acute toxæmia*—The clinical features of this stage were at one time familiar to all with experience of burns In cases with slight or no shock there was an interval of from 12 to 24 hours in which the general condition seemed entirely satisfactory With the onset of toxæmia the temperature rose, the pulse and respiration rate increased, the colour became dusky or livid, a state of anxiety and restlessness or of apathy appeared, and vomiting was frequent In its fulminating form, which was common in children, acute toxæmia was rapidly fatal

Much evidence is available to support the view that "secondary wound shock" and also the acute toxæmia of burns are the result of absorption of a toxin or toxins into the circulation from the injured area Recently, criticism has been directed at this view The constitutional disturbances of burns have been attributed to concentration of the blood,<sup>4</sup> and the fall in blood-



pressure mainly or wholly to plasma loss<sup>2</sup> The evidence in support of the newer views is not yet so complete as to call for desertion of the older conception.

Fortunately, the principles of treatment can be stated with certitude. Coagulation of the injured surface by tannic acid prevents or minimizes the symptoms of acute toxæmia, whether by fixation of toxins or prevention of fluid loss. Those who are content with administration of fluids, on the principle of "neutralizing the toxins," and who omit coagulation treatment, fail to use the most powerful weapon at their command. The importance of administering fluids should not, however, be forgotten. A common recommendation is to exhibit large quantities of alkali. The reason is not clear. There is no satisfactory evidence that any constant disturbance of the acid-base equilibrium occurs in acute toxæmia, and proof of beneficial action of alkalis is also lacking.

Our experience has shown that early coagulation of the injured surface modifies profoundly the clinical course. Acute toxæmia never occurs in a fulminating form, and is almost always absent in burns of small or moderate extent. In cases coming under treatment during the toxic stage the unfavourable signs usually disappear rapidly after coagulation has been secured. Acute toxæmia, even possibly of mild degree, may well, however, determine the issue adversely after severe shock in extensive or very extensive lesions.

*Stage 3 Stage of septic toxæmia*—The clinical features, pathology and principles of treatment are those of an infected wound.

The results of treatment by coagulation in regard to sepsis are of much practical importance. Formerly, a mild degree of sepsis was common in the tannic-acid method and constituted one of its main disadvantages. Such is no longer the case. In superficial lesions, as, for example, after scalding, sepsis can be almost entirely eliminated by a technique to be described

later. In deep burns, however treated, sepsis is inevitable. On that account some authorities recommend treatment of deep lesions by frequent immersion in baths from the commencement. It may be noted that acute toxæmia is often not prominent in deep lesions, no doubt because the skin is completely destroyed and the less vascular deeper tissues have a much smaller area for absorption. Moreover, coagulation affects only a thin surface layer and absorption of toxins cannot thereby be prevented. Treatment by primary coagulation is, nevertheless, preferable. It permits of the more effective treatment of shock,

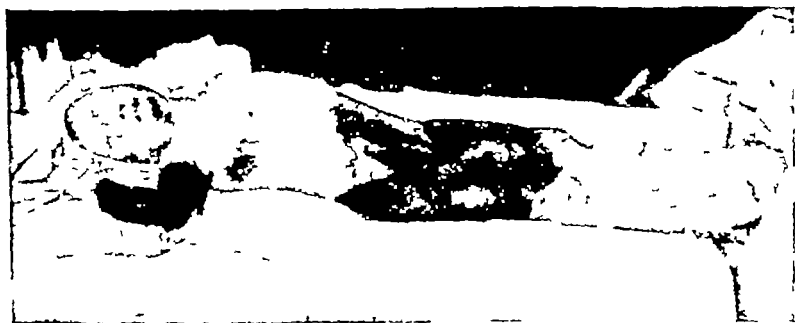


FIG. 1.—Photograph on third day of extensive burns. Acute toxæmia was not marked. Child recovered.

promotes comfort, and allows a period of several days' rest before the battle against sepsis begins. Moreover, the sepsis which occurs in a deep burn so treated is usually associated with constitutional symptoms of surprisingly mild degree.

When sepsis is manifest in the coagulation method, the tanned layers must be removed and treatment as for an infected wound be instituted.

*Stage 4. Stage of healing*—Questions arise at this stage relating to general and plastic surgery of a scope too extensive for this article.

#### GENERAL CONCLUSIONS IN REGARD TO PRESENT-DAY TREATMENT OF BURNS

The basis of the modern treatment of burns is

and nursing management will necessarily be difficult.

Description of treatment at the patient's own home is given for the guidance of the practitioner who cannot call on alternative accommodation, or who undertakes the care of a small superficial burn in favourable conditions

*Management of cases in hospital*—In the case of a burn of small or moderate extent and without notable degree of shock, the patient is put to bed, and the bed-clothes are supported by a "cage," which contains electric lamp bulbs or other means of supplying artificial heat, and the area exposed to the air. If pain is severe, morphine or heroin is given.

*Cleansing*—The area is cleansed under general anæsthesia. The anæsthetic of choice is nitrous oxide and oxygen, but ether can usually be given with safety. Cleansing is done by first removing all epithelium which is loose or raised by blistering. Special care is necessary to remove any epithelium at the edges which is partially separated. The raw surface is *gently* swabbed, first with ether or alcohol, and then with a 1 in 1,000 corrosive sublimate solution. Vigorous rubbing or scrubbing is unnecessary and harmful.

The coagulating solution is then sprayed over the raw surface from an atomizer of any form and dried immediately by a current of hot air from an electric drier or simply by heat from the bulbs in the cage. Spraying and drying are carried out at intervals of one hour, or less if desired. Seven to ten applications are sufficient in the great majority of cases, rarely more than twelve are necessary. An alternative method to spraying is to cover the area with gauze and to soak this with the solution at frequent intervals, keeping it moist until a coagulum forms. The gauze is then removed. After the coagulum is formed, the parts are kept exposed to the air. In burns of the face and head it is necessary to protect the eyes, nostrils, and auditory meatus with moist wool during the spraying,

which is the most suitable method for such lesions

*Coagulating solution*—We have experimented with various methods of inducing coagulation. The following solution is found to be the most satisfactory; it practically eliminates the mild degrees of sepsis previously found in scattered areas and seems also to hasten coagulation. It is an aqueous solution of 2.5 per cent tannic acid and 1 in 1,000 acriflavine.\* Packets of powder are kept containing 7.5 grams of tannic acid and 0.3 grams of acriflavine. A convenient amount of solution is made by dissolving such a packet of powder in 300 c cm of warm sterile water. The solution should be made freshly for each case or occasion—not necessarily for each application.

*Subsequent care*—No special local treatment is necessary after the coagulum has formed. The area is exposed to the air and can be protected from trauma and soiling by ordinary care. Burns of the perineum are treated with the patient in the prone position or lying on a frame, such as Whitman's, with a space in the supporting canvas opposite the affected part. In uncomplicated cases the coagulum is allowed to separate itself. Frequently healing has become complete by the time it can readily be peeled off. Any raw areas left may be covered with a bland ointment dressing.

*Sepsis*—In deep burns the same primary treatment is followed. Towards the end of the second week signs of sepsis under the coagulated layer develop and are most manifest at the edges. It is necessary then to remove the coagulum. Different methods are advised for carrying this out. On the whole, we prefer to do so mechanically by cutting it away with scissors. It is occasionally convenient to remove coagulum together with sloughs under general anaesthesia. Treat-

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\* Acriflavine was introduced originally as the result of a suggestion for first-aid treatment made by Dr S. W. Fisher, H.M. Medical Inspector of Mines.

ment of the area as an infected wound is then begun, by fomentations, antiseptic dressings, and baths.

*General treatment.*—The supply of fluids is of great moment, especially when treatment is begun during the toxic stage. In the severest cases administration of normal saline by intravenous and subcutaneous routes may be necessary, as well as copious quantities of fluid by mouth and rectum. The necessity for frequent estimation of temperature in infants and young children is not sufficiently realized. It is by no means uncommon in them for the temperature to rise suddenly about the beginning of the toxic stage. Continued application of heat will then cause severe distress, and even possibly lead to a fatality. On artificial cooling the distress rapidly disappears. In infants estimations of rectal temperature should be made every 30 to 60 minutes, and the body temperature regulated accordingly.

*Treatment of shock in extensive burns*—Treatment of this condition requires special mention. In shock the first indications are artificial heat, morphia, which seems to have a beneficial action, and fluids. The effect of this treatment is closely observed. If after an hour the systolic pressure remains below the critical level of 80 mm. Hg, or if the pressure, originally above the critical level, fails to rise, blood transfusion or intravenous infusion of gum saline is required. A failure to respond to the last measure is ominous. A very low pressure or a falling pressure may call for intravenous therapy without delay.

*Local treatment*—This should be as early as may be feasible, since coagulation helps to combat shock by lessening fluid loss and pain. Local treatment, however, involves factors which may aggravate shock, e.g. general anæsthesia, and, even with the exercise of care, exposure and mild trauma. While the systolic pressure remains below 80 mm. Hg, local treatment should not be instituted, and preferably is delayed.

until the pressure is above 90 mm Hg

*Anæsthesia* —Nitrous oxide and oxygen should be used. The anæsthesia need not be deep and cyanosis must be rigidly avoided. A ratio of nitrous oxide to oxygen of 3 to 1 is the highest permissible. Anæsthesia is terminated by giving a mixture of CO<sub>2</sub> and oxygen, or of CO<sub>2</sub> and air, if the necessary apparatus is available. Undue exposure and unnecessary trauma in cleansing are especially deleterious.

The treatment described above is suitable for all types of thermal injuries and also for electrical burns.

*Treatment at the patient's home* —The practitioner in favourable circumstances, with the help of a nurse trained in the method, may be able to follow fairly closely the method detailed before for the treatment of small or moderate burns. Otherwise the following plan can be adopted. The area is cleansed in the usual way under anæsthesia. Gauze soaked in the coagulating solution is applied to the raw surface and covered with wool and a bandage. The dressing may be left for 24 hours or renewed at 12 hours. A coagulum forms which can then be dried by exposure to the air for a short time. After the coagulum has formed, it may be exposed to the air continuously if means for its protection are available. Otherwise it should be covered by a dressing of dry gauze and a bandage. Subsequent treatment is as detailed before.

Successful treatment by tannic acid demands interest, care and attention from those who employ it. They will be well repaid by the results.

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# Some Recent Advances in Medical Research

IN the January number of THE PRACTITIONER an article appeared summarizing, from the point of view of practice, a few of the more recent advances in medical science. The material in that article was abstracted from papers published in a wide range of scientific literature, with the object of giving the practitioner a brief review of important or promising new studies. With the same object in view, a further series of summaries of recent work is given below.

## UNDULANT FEVER

The large number of papers on undulant fever published in Great Britain during the last few years would alone give an indication of its increasing recognition in this country. Yet a few years ago it was generally believed that the disease was, from the point of view of the British practitioner, an interesting but inconsiderable curiosity, almost confined to particular parts of the Mediterranean basin. It was formerly known as "Mediterranean" or "Malta" fever, the latter name being derived from the prevalence of the disease in Malta at the end of the last century. The discoveries by Bruce of the causative organism, the *Micrococcus melitensis*, and by Wright of the presence of specific agglutinins to this organism in the blood of patients and experimentally infected animals, led to the proof by Zammit and Horrocks that the drinking of infected goats' milk was in Malta the principal cause of the spread of the infection. In 1906, an order was accordingly issued to the British forces in Malta,

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This is the second of a series of articles dealing with recent advances in medical research, of which the first appeared in THE PRACTITIONER, January, 1932, cxxviii, 96

forbidding the drinking of unboiled goats' milk, and since that time the incidence of "Malta fever" in Malta has become almost negligible

Of recent years, however, attention has been increasingly directed to the possibility that this infection may be the correct diagnosis of some obscure febrile illnesses seen from time to time in many different countries throughout the world. It is now known, as the result of the researches of Evans and Burnet, that the *Micrococcus melitensis*, isolated by Bruce in 1887 as the cause of "Malta fever," is closely related morphologically, culturally and serologically to the *Bacillus abortus* of Bang, the cause of epidemic abortion in cattle. These organisms, now classed under the generic name of *Brucella*, have been shown by recent work in the United States, France, Denmark and this country to be in fact but different strains of a single group and capable of producing identical clinical symptoms in man.

The symptoms and epidemiology of undulant fever were very fully discussed in 1929 in a Ministry of Health report by Dalrymple-Champneys,<sup>1</sup> which included an extensive bibliography of the subject. The main features of the disease, as "typically" seen, are pyrexia of peculiar type, sweating, asthma, joint pains, and enlargement of the spleen. Its most striking characteristics are the long duration and periodicity of the fever. In a "classical" case the course of the disease is "marked by a series of febrile attacks, each of which lasts for one or more weeks, followed by a period of absolute or relative apyrexia of uncertain duration." A number of atypical cases have, however, recently been reported in which the disease has run its entire course without remissions. Considering the extreme "illness" of the patients during the febrile attacks, the disease has a surprisingly low mortality. The average duration of the "typical" illness, including remissions, is about three months, but



cases have been recorded in which the disease has persisted for more than a year, to be followed by perfect recovery. In cases without remissions the course is liable to be shorter, averaging about six weeks.

From the practitioner's point of view, the main significance of undulant fever is in relation to the differential diagnosis of the enteric fevers, tuberculosis, malignant endocarditis, rheumatic infection and other conditions associated with continued or remittent pyrexia. It is a disease to be remembered as a possibility before an obscure case of fever is labelled despairingly, "P.U.O." The clinical features of the disease can be quite protean. In fact, the fever of "undulant fever" need not be undulant. Cases with pronounced joint affection have frequently been labelled "gonococcal septicæmia". A case has been described in which successive diagnoses of gonococcal arthritis, influenza, typhoid, paratyphoid, malaria, pleural effusion and pulmonary tuberculosis were made before *Brucella* infection was suspected and finally confirmed. The good ultimate prognosis that can be given in undulant fever, because of its low mortality rate, would itself make its correct diagnosis of more than academic interest, apart from other, such as epidemiological, considerations. Fortunately, the disease can readily be diagnosed by bacteriological means, in particular by a serological test akin to the Widal reaction for enteric fevers. The *Brucella abortus* of cattle, the commonest *Brucella* infection in this country, is strongly agglutinated by the serum of actively infected patients, and the increasing tendency among bacteriologists to include a test against *Brucella* when examining blood-specimens for typhoid has already shown that the former infection is a considerable disease entity in the British Isles.

Much work has recently been done to determine the methods by which undulant fever may be contracted in this country. It is now known that *Brucella*

infections may occur in many different animals, including cows, pigs, dogs and horses. Apart from direct contact with an animal harbouring the organism it seems likely that the most ready source of human infection is the milk supply. The *Brucella abortus* is known to persist for long periods in the udders of infected cows, and studies by Smith<sup>2</sup> and by Beattie<sup>3</sup> have shown that in Scotland, at any rate, about 30 per cent. of unsterilized milk samples may contain this organism in the living state. This surprisingly high incidence of milk infection is strangely disproportionate to the number of declared human cases, and further research is necessary to decide what additional factors may contribute to an active human infection.

As stated recently in the *Lancet*,<sup>4</sup> "Our ignorance of the epidemiology of undulant fever calls for intensive inquiry by all types of workers" concerned in the study of infective disease in man and animals. In particular, further extensive examinations of the milk supply in England, on the lines of those made by Smith and Beattie in Scotland, would seem to be urgently called for to determine to what extent this "danger" is involved in the drinking of unboiled cows' milk.

#### THE TREATMENT OF ADDISON'S DISEASE

A new and promising development of organotherapy relates to the treatment of Addison's disease with extracts of suprarenal cortex. Until recently, it was generally thought that the characteristic symptoms of the disease were caused by deficiency or absence of the medullary secretion of the suprarenal gland and, in consequence, it has hitherto been the custom to treat these patients with injections of adrenaline. The results have been disappointing, though transient benefit has often been recorded.

As the result of the work of Hartman, of Stewart and Rogoff and of Swingle and Pfiffner, there are now strong grounds for believing that the essential

"deficiency" in Addison's disease is of the cortex of the suprarenal, as opposed to its medulla. Swingle and Pfiffner<sup>5</sup> showed that it was possible to maintain the life of suprarenalectomized cats for an indefinite period by giving injections of cortex, whereas adrenaline had little or no effect on the survival period. The logical development of these experiments has been the treatment with cortical extracts of Addison's disease in man, and favourable results have already been reported by Rowntree and his co-workers<sup>6</sup> in America, and by Levy Simpson,<sup>7, 8, 9</sup> in this country.

The last worker recently published<sup>9</sup> an account of six undoubted cases of Addison's disease treated by this means. He used an extract of suprarenal cortex prepared according to the method of Swingle and Pfiffner and almost entirely free from adrenaline. All six patients benefited initially from the cortical extract therapy, though three of them subsequently died from complications of their primary disease. The other three have remained in relatively good health since the treatment was started, i.e. for nine, six and two months respectively, at the time of Levy Simpson's publication. In two of the cases it was recorded that the effect of the cortical extract was "as definite and dramatic as that of insulin in diabetic coma," the patients having been almost moribund before treatment. In the cases which improved under treatment, nearly all the characteristic symptoms and signs of Addison's disease tended to lessen, even the pigmentation decreasing rapidly, though this has not vanished completely from any of the patients observed. The extract of suprarenal cortex was given by injection, intravenously for the first week in severe cases, and intramuscularly afterwards. It was found to be important that the extracts used should be as free from adrenaline as possible, since the intravenous injection of adrenaline might lead to severe reactions. Benham and others<sup>10</sup> have also suggested that a trace of protein

in the extracts may be a source of danger. They have stressed the necessity for great caution in giving the extract in its present form, until it is possible to eliminate with certainty all protein and adrenaline and to obtain a reliable method of chemical or biological assay.

At present, it may be said that, considering the inevitably fatal termination of untreated Addison's disease, the results obtained so far with cortical extracts have been distinctly encouraging, but that further research work is necessary to obtain therapeutic extracts which can be used with safety and precision of dosage. It is noteworthy that although, as Levy Simpson says, "clinical experience and general considerations of hormone therapy indicate the necessity for continued administration of cortical extract," in one of his patients good health has been maintained for eight months after the last injection. He considers that this may be due to the fact that the patient is at the menopause, in relation to which a readjustment of ductless gland balance may be taking place.

#### NUTRITIONAL ANÆMIA IN INFANCY

In a recent report of the Medical Research Council, Dr. Helen Mackay<sup>11</sup> and her co-workers called attention to a common condition of anæmia occurring, but apt to be unrecognized, in infants during the first two or three years of life. This anæmia, like the now extinct chlorosis, has been shown to be readily curable by giving iron salts, though there is evidence that not the iron alone but also traces of other metals (copper and possibly manganese) present in these salts may play a part in the therapeutic effect. Lewis<sup>12</sup> and Parsons<sup>13</sup> believe that copper is an important adjunct to iron in the treatment of the condition, and it is of interest to note that Shelden and Ramage<sup>14</sup> found by a spectrographic method that manganese also was a constant impurity in a large number of therapeutic preparations.

# Practical Notes

## *Gastric and Duodenal Ulcer*

Richard H. Miller (*New England Journal of Medicine*, May 5, 1932, ccvi, 925) publishes a review of gastric and duodenal ulcer. He suggests that disturbances in the relaxation of the pyloric sphincter (achalasia) probably have a great causative effect, in that such disturbances prevent the normal regurgitation of alkaline duodenal contents into the stomach to neutralize the irritating acid of that organ. This difficulty has been treated by some surgeons by attempting to sever the nerves which cause contraction of the pyloric musculature. The possibility of peptic ulcer being, at least in part, dependent on, or resulting from, an infection elsewhere in the body, is being continually studied, and the finding of the same strains of streptococci in ulcers, as in distant foci, is an observation of enough scientific accuracy and constancy to demand consideration (A. C. Nickel, *Ann Int Med*, May, 1930, iii, 1084). The modern treatment of peptic ulcer includes the removal of all such possible foci. The familial tendency to peptic ulcer is constantly noted, as well as the co-called "ulcer diathesis," or individual susceptibility. In the consideration of ulcer of the stomach the first and most important question to be settled is whether the lesion may or may not be cancerous—whether it is a definite cancer, or whether it is an ulcer which possibly shows the beginning of malignant degeneration. A. G. Brenizer (*Ann Surg*, September, 1930, xcii, 367) states that all ulcers in the antrum and body, along the lesser curvature, are benign, and all ulcers outside this zone are malignant, he further states frankly that he is not sure about the percentage of development of carcinoma in chronic ulcers, or whether cancer starts out as pure cancer in the beginning. W. C. MacCarty (*Collected Papers of the Mayo Clinic*, 1930, xxii, 41) finds that the earliest discoverable cancers have been in the borders of chronic ulcers, and that most ulcers of a diameter of 2.5 cm. or more are already cancer. He argues that cancer must develop in (1) normal mucous membrane (a rare occurrence), in (2) a polyp (equally rare), or in (3) a chronic gastric ulcer, the last he considers the most reasonable. In his opinion the great majority of gastric cancers develop in the chronic gastric ulcers, and 10 per cent of all ulcers are, or will become, malignant. He believes that exploration with resection is a safer procedure than expectant treatment, at the Mayo Clinic the operative mortality is 3–5 per cent, while the occurrence of cancer is 10 per cent. W. C. Alvarez (*Journ Am Med Assoc*, July 11, 1931, xcvi, 77) notes that most large lesions are malignant, and most small ones are benign, but the point which he emphasizes most strongly is that the radiologist cannot always be sure. As we learn more about duodenal ulcer it is becoming increasingly evident that cases for operation must be carefully selected, and preferably should be those that have definitely failed to be cured after long and careful medical treatment. In this connection D. C. Balfour (*Collected Papers of the Mayo Clinic*, 1930, xxii, 56) says that the duodenal cases which do badly

after operation are those who are young, who have no pyloric obstruction, and who have a high degree of hyperacidity, Fremont-Smith and McIver (*Am Journ Med Sci*, January, 1929, clxvii, 33) likewise say that the duodenal ulcers of long duration and severe symptoms have better post-operative results. The high acidity is probably what initiates and maintains a peptic ulcer, and it, in turn, is probably caused by dysfunction of the pylorus, which does not relax properly and allow normal regurgitation into the stomach of the duodenal contents, which are more strongly alkaline than any other fluids of the body (R. Ellman, *Surg, Gynec, Obst*, July, 1929, xlix, 34, J. B. Deaver and V. G. Burden, *Ann Surg*, November, 1931, lxi, 818). Any operation to cure peptic ulcer must, therefore, provide for this regurgitation of neutralizing juices, whether through the pylorus or through a new stoma.

### Varicose Vein Solutions

N. J. Kilbourne, W. Dodson and A. H. Zeiler discuss varicose vein solutions with reference to toxicity, slough-producing properties, and bactericidal action as related to phlebitis and embolism. The authors state that mercury bichloride and bimiodide in the injection treatment of varicose veins have been fatally toxic in three cases. Metaphen is less toxic and is not likely to cause a slough. Experiments on rabbits did not indicate serious danger from toxicity in other solutions tested. Sugar derivatives and sodium chloride are non-toxic and relatively painless. Their use has been associated with an incidence of deaths from infection and embolism not found with quinine-urethane. Unlike quinine-urethane, they are not self-sterilizing or bactericidal. Since they are easily contaminated they should be handled with extraordinary care in technique to prevent infection. The sloughs which they make when injected into the tissues are less serious than the salicylate and quinine sloughs. Sodium salicylate is efficient as a sclerosing agent. It is bactericidal to *Staphylococcus aureus* only in the strong solutions. It may cause a painful cramp after injection, and the sloughs which it makes are more serious than those following dextrose and sodium chloride. Lithium salicylate obviates the pain of sodium salicylate, but is slightly more toxic and is said not to keep well in solution. Quinine-urethane is highly efficient as a sclerosing agent, and even when diluted is bactericidal to *staphylococcus aureus*. It has a perfect mortality record, possibly due to its bactericidal action in preventing phlebitis and embolism. It may be slightly toxic to occasional patients, and when injected out of the vein does not give the warning of pain given by the other solutions. It causes no pain at time of injection, and if the leg is kept bandaged, the occasional pain the next day is usually prevented. Because of its perfect mortality record the authors regard it in expert hands the solution of choice—except in small superficial thin-walled veins, provided, of course, it is used by those sufficiently experienced not to allow extravascular escape. Sodium morrhuate is not a toxic solution, and if injected into the tissues out of the vein the sloughs which it makes are not so serious as the salicylate and quinine sloughs. It is not bactericidal or self-sterilizing—  
(*Surgery, Gynecology and Obstetrics*, April, 1932, lvi, 640)

# Reviews of Books

*Recent Advances in Pathology* By GEOFFREY HADFIELD, M D, F R C P, and LAWRENCE P GARROD, M B, M R C P  
London J and A Churchill, 1932 Pp x and 392 Illustrations 67 Price 15s

THIS addition to the successful "Recent Advances" series, which now numbers twenty-five, is, it may at once be said, an admirable and much needed work, for it is on the practical lines of dealing with pathology as an essential part of medicine and not as an abstract branch of science. The scope of such a survey is immense, and some aspects of pathology, such as hæmatology and bacteriology, which are considered in other volumes in this series, are omitted, but the blood-forming organs are not entirely excluded, for splenomegaly and the effects of irradiation on the blood are considered. Other subjects, for example, syphilis, tuberculosis, lymphadenoma and jaundice, are not dealt with in special sections. Each subject is provided with a select bibliography, and the amount of literary research that the authors have undertaken is remarkable, for example, the section on Bright's disease shows that the recent monographs have been studied and their conclusions critically assimilated and blended. The large subject of cancer, and especially its experimental production, receives ample attention, and a chapter is devoted to therapeutic cancer research. Vitamins and the affections of the endocrine glands, like, in fact, the subjects in the remainder of the book, are summarized in a thoroughly up-to-date manner. Under the heading of pneumonia its serum treatment finds a place. The present views about primary malignant disease of the lungs are given, and illustrations of asbestos bodies occupy a full page. The illustrations are excellent, especially, perhaps, in the section on Bright's disease.

*A Textbook of Surgical Pathology* By CHARLES F W ILLINGWORTH, M D, F R C S E, and BRUCE M DIOK, M B, F R C S E  
London J and A Churchill, 1932 Pp 670 Figs 290 Price 36s

To the graduates and senior students to whom this work is addressed we commend it as one that at last satisfies a need of long standing, for to these two Edinburgh surgeons we are indebted for a valuable contribution to textbook literature. To those familiar with surgical publications the words "surgical pathology" may form a sometimes sinister conjunction, connoting the facile and the opportune, but not always the basic truth. Here, however, is a combination of uniform soundness with the up-to-date and modern expressed with a clarity and simplicity that make the book, once opened, hard to lay aside, and we believe it will have a wider appeal than that modestly claimed by the authors. They are in truth writing of surgical disease rather than of morbid anatomy alone, b their thesis continually upon pathological processes they connected whole at once logical and devoid of the

empirical Appendicitis is well described, due stress being laid upon the obstructive factor in its etiology, though we should have liked to see some mention of the bacteriology, and regard as a serious omission the absence of any reference to associated intestinal obstruction. The work of one of the authors on the formation of gall-stones has added to the value of a very illuminating chapter. The modern development in calcium metabolism and the parathyroid hormone are well and clearly described. In the vascular section the account of the endotheliomas is sketchy, and the attribution of the discoloration associated with traumatic asphyxia to ecchymosis will not find universal acceptance. The print is clear and pleasing and the form spacious and distinguished. The illustrations, however, especially in view of the name of the publishers, are somewhat disappointing—it would have been better, for example, to have reproduced the skiagrams from the original films rather than from prints.

*A Guide to General Practice* By A. H. DOUTHWAITE, M.D., F.R.C.P.  
London H. K. Lewis and Co., Ltd., 1932 Pp vii and 96  
Price 4s 6d

THIS handy and pleasantly written guide by a consultant who had five years' experience of general practice before he became assistant physician to Guy's Hospital, is an expansion of three lectures on general practice delivered last year. It is full of sound advice and should be read, inwardly digested and assimilated by every man before going into practice and partnership so as to avoid financial catastrophe. Partnership is recommended in preference to "squatting," full information is given about the articles of partnership, and a warning is thrown out against accepting the suggestion that such an agreement is unnecessary because "we are both of the same hospital. Why waste money on legal procedure when we who worked in the same school can obviously trust each other?" The remarks on what is commonly spoken of as professional etiquette or ethics are shrewd and valuable.

*Fraud in Medico-legal Practice* By SIR JOHN COLLIE, C.M.G., M.D.  
London Edward Arnold and Co., 1932 Pp xi and 276  
Figs 47 Price 11s 6d

THIS authoritative work is based on the second edition, now out of print, of the author's well-known book on *Malingering*. Needless to say it is the outcome of long and exceptional experience and convincingly impresses the reader with the logical method of arriving at sound conclusions and the value of a highly-developed degree of practical psychology. An attractive feature is the way in which important points are carried home by the introduction of appropriate anecdotal cases. The modern prevalence of fraud in medico-legal practice is traced to the Workmen's Compensation Act and to the Trades Unions and other clubs. In the past the detection of malingering was mainly needed in the fighting services, but it now concerns panel and other practitioners. Much valuable



advice is given to the medical witness, for example, not to trespass upon the legal aspect of the case, for the question of liability is one for the lawyers, and particular attention may be called to the chapter on "The law of libel and the medical witness," a subject on which the information rests not only on the author's extensive experience, but is also fortified by consultation with the legal profession

*Medicine and the State* By SIR ARTHUR NEWSHOLME, K C B, M.D.,  
F R C P With a Foreword by WILLIAM H WELCH, M.D.,  
LL D London George Allen and Unwin, Ltd, 1932 Pp 300  
- Price 7s 6d

THIS is a critical summary of the three volumes of international studies made in Europe on the relation between the private and official practice of medicine, with special reference to the prevention of disease, by Sir Arthur Newsholme for the Milbank Memorial Fund of New York Sir Arthur, who was the last Principal Medical Officer of Health of the Local Government Board before it was, in 1919, merged in the Ministry of Health, was for two years before he began, in 1928, the international survey in Europe, attached to the new School of Hygiene and Public Health of the Johns Hopkins University, Baltimore, as Lecturer on Public Health Administration But with all his experience he is very chary in suggesting the application of any developments of European medical practice to the circumstances of the United States of North America He is solely responsible for the contents of the present volume, which is largely based on the information collected in the three previous reports, but also contains a number of opinions essentially controversial While taking a broad outlook special attention is paid to the various developments, agencies and tendencies which have caused friction between private practitioners and public health authorities The first of the three parts into which this work is divided deals with general considerations bearing on medical care, the machinery for securing the prevention of disease and its cost, domiciliary medical care of the necessitous, hospitals and medical care and the relation to private practice, and insurance for medical treatment In the second part an outline description is given of the medical care of motherhood, childhood and youth, and of the prevention and treatment of tuberculosis and venereal disease The third part contains a number of thoughtful and critical essays on the relation between hospital authorities, public health authorities and insurance authorities respectively and private practitioners, as bearing on the future of private practice The obstacles to progress in medicine are philosophically considered, and in the penultimate chapter on medicine and character he has no fear about the final outcome of the struggle between individual interest and communal welfare

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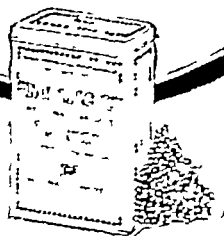
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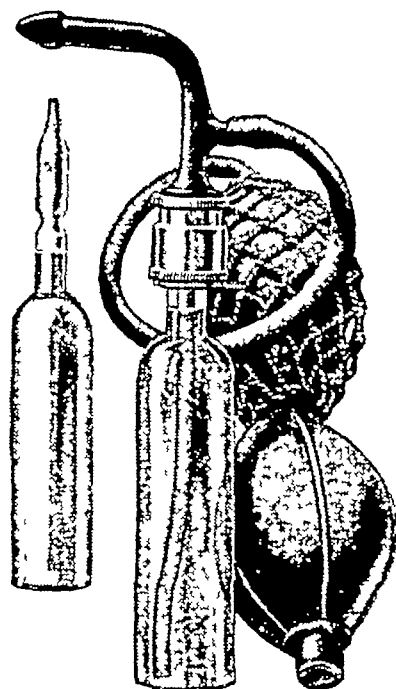
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